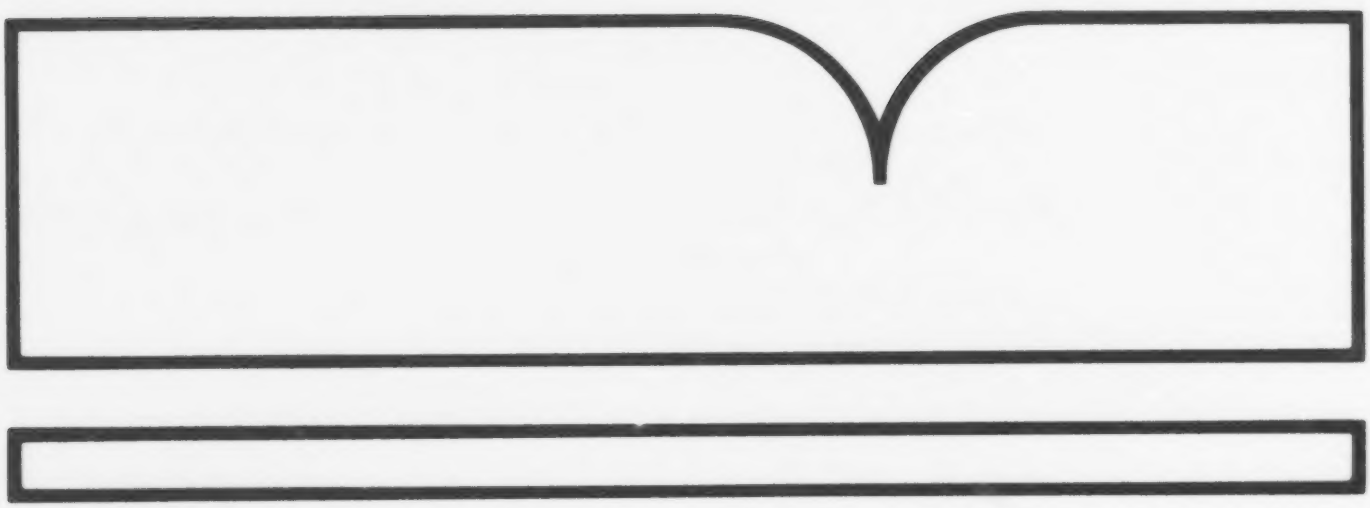
PB90-204348

Superfund Record of Decision (EPA Region 9): Beckman Instruments Site, Porterville, CA (First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

26 Sep 89



U.S. Department of Commerce
National Technical Information Service
NTIS

PB90-204348

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/RO9-89/041
September 1989

EPA

Superfund Record of Decision:

Beckman Instruments, CA

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U.S. DEPARTMENT OF COMMERCE
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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Beckman Instruments (Porterville) site, which includes the Beckman plant and surrounding study area, is in the city of Porterville, California. The 12-acre Beckman plant has manufactured electronic instrument assemblies and circuit boards since 1967. Wastewater from industrial processes including electroplating and degreasing, contains spent halogenated solvents, inorganic and acid solutions, salts, metal-laden solutions, and plating bath sludges. From 1974 to 1983, wastewater was discharged to an onsite solar evaporation pond; however, since 1983, wastewater has been treated onsite. Ground water in the vicinity of the pond was used for domestic and agricultural purposes until 1983 when ground water was found to be contaminated. Beckman subsequently closed the pond, provided alternate water supplies to approximately 300 residents in the area, and began ground water pumping and treatment using air stripping in 1985. Additionally, soil beneath the former pond as well as near a former pesticide operation area are known to be contaminated with elevated levels of lead. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE, and metals including lead.

The selected remedial action for this site includes excavation and offsite disposal of lead-contaminated soil; continued operation of the ground water pumping and treatment system for the upper aquifer; pumping and treatment of ground water from upper aquitard and lower aquifer using air stripping; offsite (Continued on next page)

17. Document Analysis a. Descriptors

Record of Decision - Beckman Instruments (Porterville), CA
First Remedial Action - Final
Contaminated Media: soil, gw
Key Contaminants: VOCs (TCE), metals (lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

16. Abstract (Continued)

EPA/ROD/R09-89/041
Beckman Instruments (Porterville), CA

discharge of all treated water into infiltration basins or irrigation canals; and ground water monitoring. The estimated present worth cost for the selected remedy is $4,740,000. This estimate does not include costs for continued operation of the existing pumping and treatment system.

RECORD OF DECISION

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BECKMAN INSTRUMENTS SITE
PORTERVILLE, CALIFORNIA

RECORD OF DECISION

United States Environmental Protection Agency

Region IX -- San Francisco, California

September 1989

RECORD OF DECISION

DECLARATION STATEMENT

Site Name

Beckman Instruments Site

Site Location

Porterville, California

Statement of Basis and Purpose

This decision document presents the selected remedy for contaminated groundwater and soil at the Beckman Instruments Site. The document was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency Plan (NCP; 40 CFR Part 300). This decision is based on the Record of Decision for this site. The attached index (Attachment 1) identifies the items on which the selection of the remedial action is based.

Description of Selected Remedy

The selected remedy for the Beckman Instruments Site addresses groundwater contaminated with volatile organic chemicals (VOCs) and soils contaminated with lead. This action represents the final remedial action to remove contaminants from groundwater and to control movement of lead in soils. Groundwater contamination was first addressed in 1985 when Beckman Instruments instituted a groundwater pump and treat program to control contaminant movement and to remove and treat contaminated groundwater. The selected remedy includes a continuation and expansion of this pump and treat program, plus other elements.

The major elements of the selected groundwater and soil remedy include:

o Groundwater Extraction, Treatment, and Discharge. This action involves pumping contaminated groundwater from the upper and lower aquifers and the aquitard separating the two aquifers. The extracted groundwater would be treated by air stripping to remove volatile organic compounds (VOCs). Treated water would be disposed of into infiltration basins to recharge groundwater. Treated water could also be used for irrigation purposes.

o Groundwater monitoring. Groundwater monitoring shall be conducted consistent with provisions under the Resource Conservation and Recovery Act, Section 264, to ensure that contaminants which exceed cleanup requirements are not released into the environment.

RECORD OF DECISION

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1 Location of Site Study Area

2 Distribution of 1,1-DCE in the Upper Aquifer

3 Extent of Contamination in the Upper Aquitard

4 Extent of Contaminants in Lower Aquifer

5 Location of the Soil Stain Area

o Soil Excavation and Disposal. Soil contaminated with lead above 200 ppm will be excavated and disposed of off-site in a disposal facility which meets RCRA and CERCLA requirements. Additional sampling to better define the contamination exceeding soil cleanup levels will be performed in the design phase.

The selected remedy is the final remedy for the Beckman Site. The remedial action will remove contaminants from the groundwater, reducing the threat to public health and allowing the aquifer to return to beneficial uses. Soil excavation and offsite disposal will eliminate any health threat and prevent movement of contaminants when the soil mass is properly contained in an approved landfill.

The selected remedy will protect groundwater resources, prevent migration of contaminated soil, and eliminate direct contact risks. The selected remedy will ensure the long-term protection of public health and the environment through removal or containment of toxic chemicals. Treatment (air stripping) will be used to remove contaminants. The present worth cost of the selected remedy is estimated at $4,740,000. This estimate does not include costs for the existing pump and treat system.

Declaration Statement

Consistent with CERCLA as amended by SARA, and to the extent practicable, the National Contingency Plan, I have determined that the selected remedy for the Beckman Instruments Site meets the remedy standards in CERCLA Section 121, 42 U.S.C Section 9621, by being protective of public health and the environment. I have determined that the selected remedy attains Federal and State requirements that are legally applicable to the hazardous substances or are relevant and appropriate under circumstances of release, and is cost effective. The selected remedy utilizes permanent solutions to the maximum extent practicable for this site. Treatment, using air stripping, will remove contaminants from the groundwater. The selected remedy will reduce volume, mobility, and toxicity of contaminated soils to the maximum extent practicable.

As the remedial action for treatment of groundwater in the lower aquifer below the site is expected to take 15 to 25 years to complete, a review of the remedial action will be conducted every 5 years after commencement to ensure that the remedy continues to provide adequate protection of public health and the environment, and to assess the feasibility of meeting cleanup goals, particularly in the aquitard.

9.26.89
Date

John Wise
for Daniel W. McGovern
Regional Administrator
EPA Region IX

RECORD OF DECISION
Beckman Instruments Site

Decision Summary

I. SITE NAME, LOCATION AND DESCRIPTION

The Beckman Instruments Site, which includes the Beckman plant and surrounding study area, is located near the southern limit of the city of Porterville, California. Porterville is located in Tulare County about 25 miles southeast of Visalia on the eastern fringe of California's Central Valley. The Beckman plant is located at 167 West Poplar Avenue and occupies approximately 12 acres of a 94.33 acre parcel of land owned by Beckman. The site study area is generally bounded by the Tule River to the north, plant property to the east, Poplar ditch to the south and Newcomb Drive on the west (Figure 1). Land use within the study area includes residential, field crop, orchard, grazing land, Tule River floodway, commercial, industrial, and vacant land. The study area contained 473 residents in 1980.

The Beckman plant consists of 7 buildings used to manufacture and repair electronic equipment, house chemicals and supplies, house the wastewater treatment plant, and to house maintenance equipment. The facility also contains a tank farm, drum storage area, and former waste handling areas.

This decision document, the final remedy for this site, addresses three response actions for the site.

1. Upper aquifer groundwater contaminated with VOCs.

2. Lower aquifer and aquitard groundwater contaminated with VOCs.

3. Soils contaminated with lead.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Beckman plant has manufactured electronic instrument assemblies, subassemblies, and printed circuit boards at the Porterville facility since 1967. Industrial processes have included electroplating and degreasing. Waste streams from these processes have included spent halogenated solvents, inorganic and acid solutions, salts, metal-laden solutions and plating bath sludges. Between 1967 and 1974, wastewater was discharged to the City of Porterville sewer system. From 1974 to 1983, waste streams were discharged to an on-site solar evaporation pond. Wastes may have also been placed in other areas near the plant. Since 1983, wastes streams have been treated on-site.

Beckman initiated groundwater monitoring in the vicinity of the solar pond in 1982. Plant chemicals were first discovered in groundwater below the solar pond and in domestic wells downgradient of the plant in 1983. The pond was closed in 1983. Prior to discovery of chemicals in the groundwater in 1983, groundwater below the site area was used for domestic and agricultural purposes. After discovery of chemicals, Beckman provided alternative water supplies to approximately 300 residences in the study area. As an additional groundwater protection measure, 8 private wells which were completed in the upper and lower aquifers were sealed or replaced with wells screened in the lower aquifer to prevent further spread of contamination.

With the discovery of contamination in groundwater, Beckman was directed by the California Department of Health Services (DHS) and the California Regional Water Quality Control Board (RWQCB) to determine the extent of groundwater contamination. By June of 1985, VOCs had migrated westward 9,000 feet downgradient of the site. Between 1983 and December 1988 Beckman installed 63 piezometers, 70 fully penetrating wells, 10 partially penetrating wells, and 2 cluster wells in the upper aquifer. Beckman also installed 20 wells into the lower aquifer and 15 containment/reclamation wells to extract groundwater for treatment. Beckman began treatment, via air stripping, of extracted groundwater in July 1985 to contain western migration of the plume, control water level gradients in the upper aquifer, and reclaim upper aquifer groundwater. A second containment and reclamation system began pumping in the eastern portion of the site area in July 1987.

In March 1985, the California Department of Health Services placed the site on California's Superfund State Priority Ranking List pursuant to Section 25356 of the California Health and Safety Code. On October 9, 1985, EPA received an official request by California DHS to assume the lead role in overseeing remedial studies and cleanup activities at the Beckman Instruments Site. The site was added to the Federal Superfund National Priorities List (NPL) by the EPA in the Federal Register notice in Volume 51, No. 111, Tuesday, June 10, 1986.

Interim Remedial Measures

Beckman has made alternate water supplies available to approximately 300 residences in the study area. Beckman has also located and abandoned wells which were acting as conduits and contributing to the migration of contaminants from the upper aquifer to the aquitard and lower aquifer. In the summer of 1985, Beckman commenced operation of a system to contain the westward migration of contaminants in the groundwater of the upper aquifer. The western containment/reclamation system consists of 11 extraction wells which pump groundwater to an air stripping tower for treatment. Treated groundwater is used for local irrigation or is placed in infiltration basins near the Tule River pursuant to RWQCB Waste Discharge Requirements

EXPLANATION
STATE HWY 60
STATE HWY 180
POPLAR DITCH
EASTERN INFILTRATION BASINS
STUDY AREA
FIGURE 1

(#85-067) and NPDES permit #CA0081663. The air releases from the western treatment tower have been permitted by the Tulare County Air Pollution Control District (TCAPCD) under permit #3679-0102-0785-01. In addition, Beckman has prepared a risk assessment on the air releases which has been reviewed by the TCAPCD and EPA. Although the site is located within a non-attainment area, the air releases are below levels specified in EPA national policy.

A second containment/reclamation system was put into operation in July, 1987. This eastern system comprises 4 wells and an air stripping tower located on the plant site. This treated water is used for irrigation or is placed in infiltration basins located northeast of the plant site. This second system is operated under RWQCB Waste Discharge Requirements (#87-105). The air releases have been permitted by the TCAPCD in permit #3679-0202-0787-01.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

All requirements for public participation as specified in Section 113(k)(2)(B)(i-v) of CERCLA were satisfied during the remedial action process for the development of the Record of Decision.

A Remedial Investigation (RI) report describing the extent of contamination within the Beckman Site study area was prepared by a consultant to Beckman and submitted to EPA in December 1988. A Feasibility Study (FS) report was released for public review in March 1989. The Proposed Cleanup Plan on the remedial action was released in June 1989. These documents were made available to the public in the Administrative Record File and information repository maintained in the EPA Docket Room in Region IX. Fact sheets, RI and FS reports and related documents, and the Proposed Plan were placed in the reference section of the Porterville Library at 41 West Thurman Avenue. Documents pertinent to the remedial action will remain at these locations for public review during the course of the remedial action. Fact sheets and the Proposed Plan have also been mailed to persons on EPA's Beckman Instruments Site mailing list, which contains members of the general public, elected officials, and Beckman Instruments.

The Notice of Availability of the FS Report and the Proposed Plan was published in the Porterville Recorder and the Visalia Times on June 12, 1989. The Proposed Plan was presented at a Public Meeting held in the Porterville City Council Chambers on June 22, 1989. At this meeting representatives of EPA discussed the Proposed Plan, answered questions about the site and the proposed remedial alternatives, and received oral comments on the Proposed Plan. The Public Comment Period began on June 12, 1989 and was originally scheduled to end on July 11, 1989. The Public Comment Period was extended by one additional week via a July 11, 1989 notice in the Porterville Recorder and Visalia Times. This resulted in a public comment period of 37 days. Comments

received at the public meeting and during the Public Comment Period are recorded and addressed in the Responsiveness Summary, an Attachment to this Record of Decision.

IV. SCOPE AND ROLE OF OPERABLE UNIT RESPONSE ACTION

During the course of the remedial investigation, three areas of the site were identified that pose a threat to public health and the environment. These three areas are:

1. Upper aquifer, contaminated with VOCs.

2. Lower Aquifer and Upper Aquitard, also contaminated with VOCs.

3. Soils contaminated with lead.

Beckman has instituted a program of extraction and treatment of contaminated groundwater in the upper aquifer which is expected to take less than 2 years to complete. A similar pump and treat program is proposed to remedy the lower aquifer and aquitard, but current projections estimate that this may not be accomplished for 15 to 25 years. The soil remedy will take less than 1 year to accomplish. Recognizing the similarity in treatment options for both aquifers and the benefits of using the same treatment unit for water pumped from either aquifer, EPA elected not to separate these actions into operable units. As the soil remedy can be readily accomplished, EPA also elected not to make this action an operable unit. This Record of Decision therefore addresses remediation of all three areas as one action, and is considered the final remedy for this site.

V. SITE CHARACTERISTICS

The site is located on the eastern fringe of the Central Valley in California. The Tule River enters the Central Valley from the mountains and foothills to the east, approximately three miles east of Porterville. The Tule river flows past the site, forming the northern boundary of the study area. The City of Porterville and the study area are situated on a broad alluvial fan of the Tule River. Much of this fan forms a relatively flat alluvial plain, characterized by surfaces of low topographic relief which rarely exceed 10 feet of elevation change, except in the vicinity of the river.

Data collected during the remedial investigation indicated the existence of a multilayer aquifer system beneath and downgradient of the plant. The aquifer system is comprised of an "upper aquifer", "upper aquitard", and "lower aquifer", based on order of occurrence of the units below ground surface and the hydraulic characteristics of the units. In addition to these units of interest at the site, a regional aquitard exists below the lower aquifer. For this reason, the aquitard of interest at this site is referred to as the "upper" aquitard. These units

TABLE 1

MAXIMUM CONTAMINANT CONCENTRATIONS IN GROUNDWATER
(micrograms per liter)

Site Contaminant	September 1988			March/May 1989		
	Upper Aquifer	Upper Aquitard	Lower Aquifer	Upper Aquifer March	Upper Aquitard May	Lower Aquifer May
1,1,1-TCA	18.0	230.0	2.7	8.3	270.0	44.0
1,1-DCE	11.0	400.0	17.0	7.7	460.0	80.0
Freon 113	16.0	240.0	16.0	5.6	310.0	16.0
1,1-DCA	2.1	3.8	6.1	2.0	3.4	5.8
TCE	0.5	18.0	26.0	ND	8.7	17.0

ND = Not Detected

are the uppermost portion of a westward thickening wedge of sediments of continental origin, including both fluvial and lacustrine sediments derived from the Sierra Nevada mountain range.

Water quality data have been collected at the site since 1983. Five primary contaminants have been identified in groundwater at the Beckman site. These volatile organic compounds include 1,1,1 Trichloroethane (1,1,1-TCA), 1,1 Dichloroethylene (1,1-DCE), Freon 113, 1,1 Dichloroethane (1,1-DCA), and Trichloroethylene (TCE). Other contaminants, such as 1,2 Dichloroethane and Benzene, have been sporadically detected in groundwater in and surrounding the site.

Upper Aquifer

The upper aquifer is comprised of silt, sand, gravel and cobbles and underlies the study area to depths of up to 75 feet below land surface. The average hydraulic conductivity of the upper aquifer is approximately 3,600 gallons per day per square foot (gpd/sq ft). The upper aquifer is unconfined, with depth to groundwater ranging between 10 to 33 feet below ground surface (in September, 1988).

Groundwater elevations in the upper aquifer fluctuate due to varying amounts of recharge from precipitation and surface water sources and due to groundwater pumpage associated with seasonal groundwater use in the vicinity of the site. During the period from 1985 to 1988 groundwater levels have declined primarily due to reduced surface water availability and increased agricultural pumpage in the area.

Groundwater flow direction, flow gradients, and flow rates in the upper aquifer are factors which determine the direction of movement of VOCs in the groundwater. These factors are influenced by recharge from surface water sources and by the operation of the two containment/reclamation wellfields. Throughout the RI/FS, the flow direction in the upper aquifer was to the west.

Contaminants apparently entered the upper aquifer in the vicinity of the solar evaporation pond and migrated to the west. The maximum concentrations of contaminants detected in September, 1988 and in March/May, 1989 in monitor or containment/reclamation wells are presented in Table 1. The area over which contaminants have been detected has been greatly reduced since the initiation of the extraction and treatment systems at Beckman. The approximate area (as of September, 1988) containing contamination at concentrations higher than the State or Federal Maximum Contaminant Levels (MCLs) or State Action Levels (SALs) listed in Table 1 is shown in Figure 2. Figure 2 illustrates the extent of contamination of the chemical 1,1,-DCE, since all other contaminants in the upper aquifer are present at concentrations less than the cleanup goals.

Upper Aquitard

The upper aquitard is comprised of a fine-grained sequence of silt, clayey silt, and sandy clay. The upper aquitard retards movement of water between the upper and lower aquifers and ranges from 10 to 60 feet in thickness. The aquitard is thinner and more coarse-grained in the area of the Beckman plant, and thickens and becomes more fine-grained to the west of the plant.

Water level elevations within the upper aquitard and the differences in water levels between the upper and lower aquifers suggest that the upper aquifer provides recharge to the upper aquitard in the area. The upper aquitard, in turn, recharges the lower aquifer.

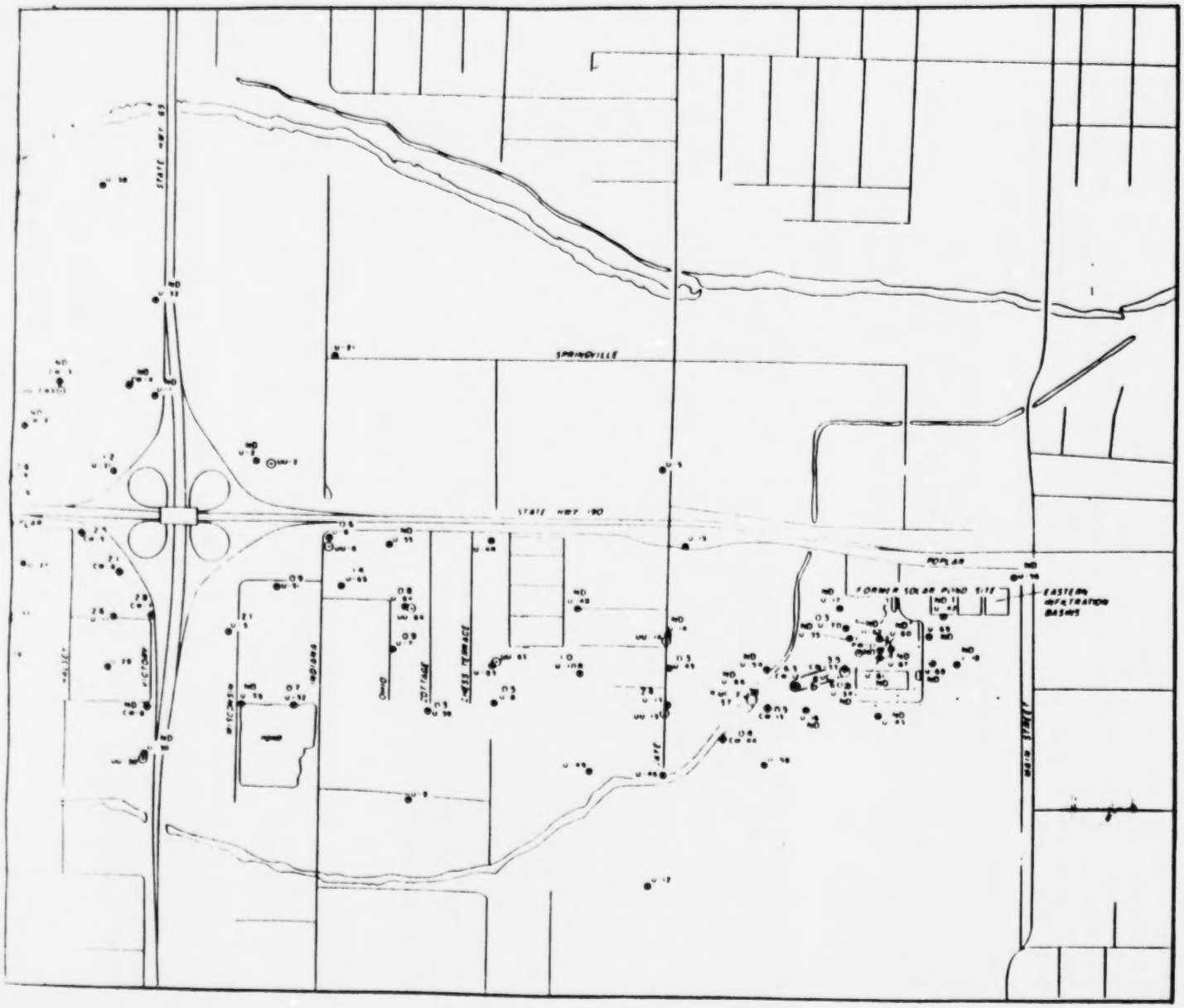
Concentrations of contaminants have been detected in five upper aquitard piezometer sets located near the plant, and one upper aquitard piezometer set located near Jaye Street as of September, 1988. The aquitard has much higher concentrations of contaminants than the upper aquifer. Contaminants have infiltrated the aquitard primarily as a result of downward migration from the upper aquifer. In some locations, existing wells which penetrated both the upper aquifer and aquitard (and lower aquifer) may have contributed to the downward migration of contaminants. The maximum concentrations of contaminants in the upper aquitard as of September, 1988 and March/May, 1989 are shown in Table 1. Contaminants have been detected in the aquitard over an area of approximately 160 acres. This area of contamination is located from just west of the plant buildings to an area west of Jaye street as shown in Figure 3. The western extent of contamination in the aquitard has not been completely defined. Groundwater extraction and treatment has not yet begun in the upper aquitard.

Lower Aquifer

The lower aquifer comprises a sequence of sand and gravel with silt and clay interbeds. The top of the lower aquifer lies 70 to 130 feet below ground surface and the aquifer is approximately 100 feet thick. The average horizontal hydraulic conductivity of the lower aquifer is approximately 55 gpd/sq ft.

Groundwater in the lower aquifer occurs under confined conditions, and the flow is generally to the west-southwest. Groundwater elevations in the lower aquifer fluctuate in response to both local and regional groundwater pumping, and to changes in recharge. Groundwater levels have declined recently, primarily due to the increased agricultural pumping in the area. These declines are consistent with region-wide trends in the Tule Groundwater Basin.

Contaminants have been detected in the lower aquifer in the vicinity of the plant (where the aquitard is relatively thin and coarse-grained) and in locations where domestic wells were previously open to both the upper and lower aquifers (where the



EXPLANATION

- UPPER AQUIFER MONITOR WELL (Constructed by Harding Lawson Associates)
- TEST WELL (Constructed by Robinson and Associates. Perforated in upper portion of upper aquifer)
- UPPER AQUIFER CONTAINMENT/RECLAMATION WELL (Constructed by Harding Lawson Associates)
- UPPER AQUIFER CLUSTER WELL (Constructed by Harding Lawson Associates) UC-1S, UC-1D, UC-1CDUC-3 and UC-2A completed in the upper portion of the upper aquifer)
- PARTIALLY PENETRATING UPPER AQUIFER MONITOR (Constructed by Harding Lawson Associates)
- CONCENTRATION OF 1,1-DICHLOROETHYLENE MICROGRAMS PER LITER
- NUMERICAL VALUE REPRESENTS CONCENTRATION IN A PARTIALLY PENETRATING MONITOR WELL IN THE CLUSTER WELL SET. COMPLETED IN THE UPPER PORTION OF THE UPPER AQUIFER

APPROXIMATE CONTOUR LINE OF EQUAL CONCENTRATION OF 1,1-DICHLOROETHYLENE, MICROGRAMS PER LITER

ND = NONE DETECTED

NOTE: WATER SAMPLES COLLECTED MARCH 16-30, 1989. ANALYSES PERFORMED BY BECKMAN ENVIRONMENTAL LABORATORY, PORTERVILLE, CALIFORNIA

Modified from Harding Lawson Associates, 1989

0 400 800 FEET

BECKMAN INSTRUMENTS, INC.
PORTERVILLE, CALIFORNIA

1,1-DICHLOROETHYLENE
UPPER AQUIFER
MARCH 1989

FIGURE 2

upper aquifer was contaminated). Contaminants have apparently reached the lower aquifer through these open wells and by downward migration through the aquitard. Contaminants in the aquitard are continuing to "leak" into the lower aquifer. The maximum concentrations of contaminants detected in lower aquifer wells as of September, 1988 and March/May, 1989 are shown in Table 1. The area containing the highest concentrations of contaminants in these units is just to the west of the Beckman plant as shown in Figure 4. Groundwater extraction and treatment has not yet begun in the lower aquifer.

Soils

Four potential soil contaminant source areas were identified and studied during the remedial investigation. These include the "soil stain" area, the former pesticide operation area, the depression area, and the former solar pond area. The soil stain area is located adjacent to one of the plant buildings and at one time a blue stain could be seen in the area, presumably from disposing of copper-containing wastes. The runoff retention basin was investigated as a potential source area in the Remedial Investigation (RI) and was concluded that this area is not a potential source. Approximately 130 soil samples were taken in the four potential source areas. Fifteen inorganic and seven organic compounds were detected above background levels at those locations (Table 2).

Only lead was present at levels considered to be a health concern. Six samples showed levels of lead between background and 40 ppm, the level identified as a cleanup goal in the Feasibility Study (FS). One sample showed lead at 40.8 ppm and one sample showed lead at 1280 ppm. Based on this information, the FS estimated the total volume of lead-contaminated soil at 740 cubic yards. The outline of the "soil stain area" which contains the lead contaminated soil is shown in Figure 5. Further sampling will be necessary to more precisely define the area of contamination which exceeds the cleanup goals of 200 ppm lead in soils which has been established in this Record of Decision.

VI. SUMMARY OF SITE RISK

EPA policy and guidance provides that the potential risk to human health and the environment be evaluated under the "no-action" scenario. This site scenario assumes the unrestricted access to site contaminants (including soils and groundwater) and that all the on-going treatment and/or mitigation measures are terminated immediately. Evaluation of the "no-action" scenario is a requirement of the National Contingency Plan (NCP), 40 CFR Section 300.68 (e) and (f), to represent a baseline condition. In addition, as stated in the proposed NCP (December 21, 1988) in Section 300.430, "the lead agency shall conduct a site-specific baseline risk assessment to characterize the current and potential threats to human health

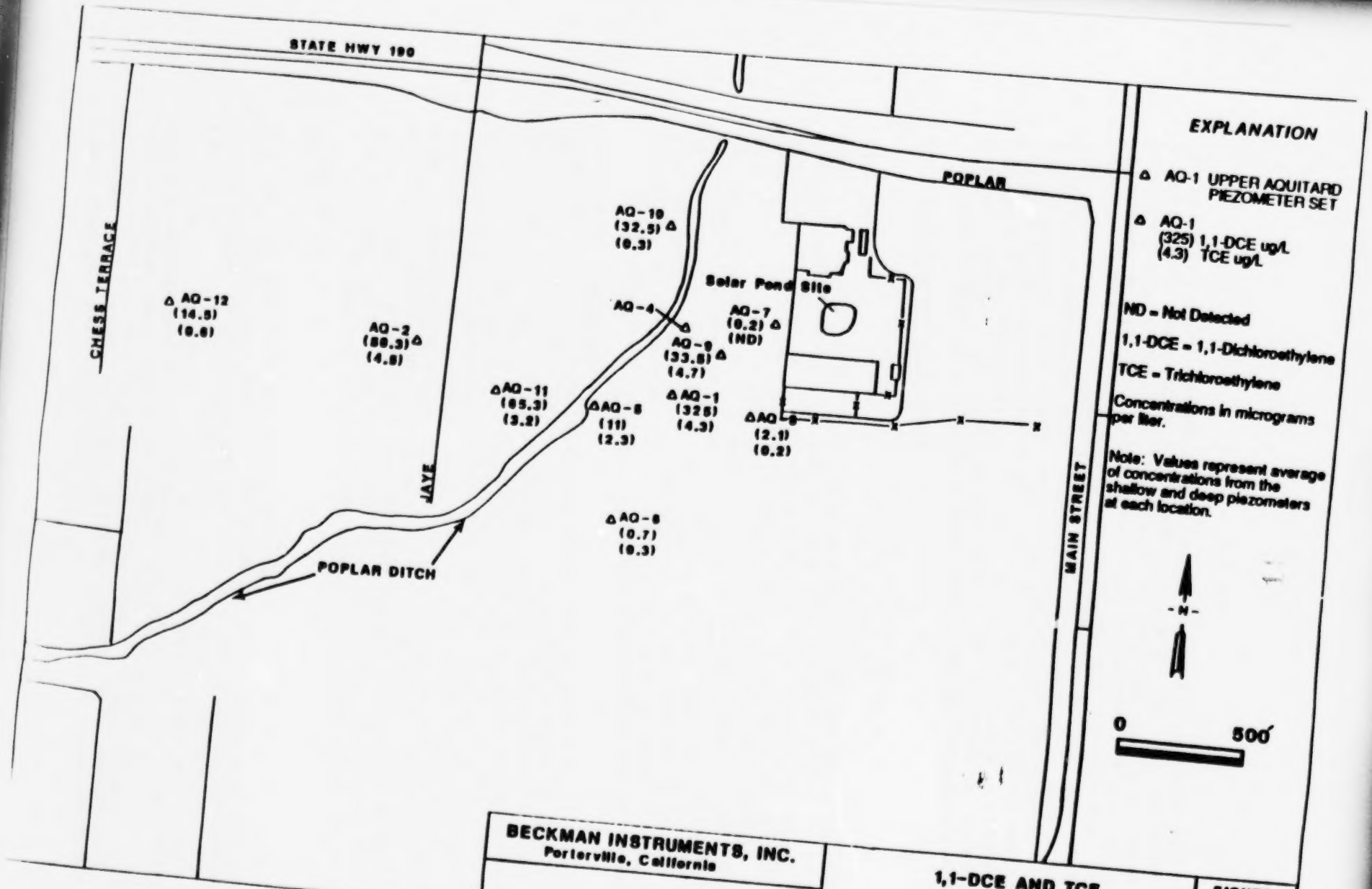
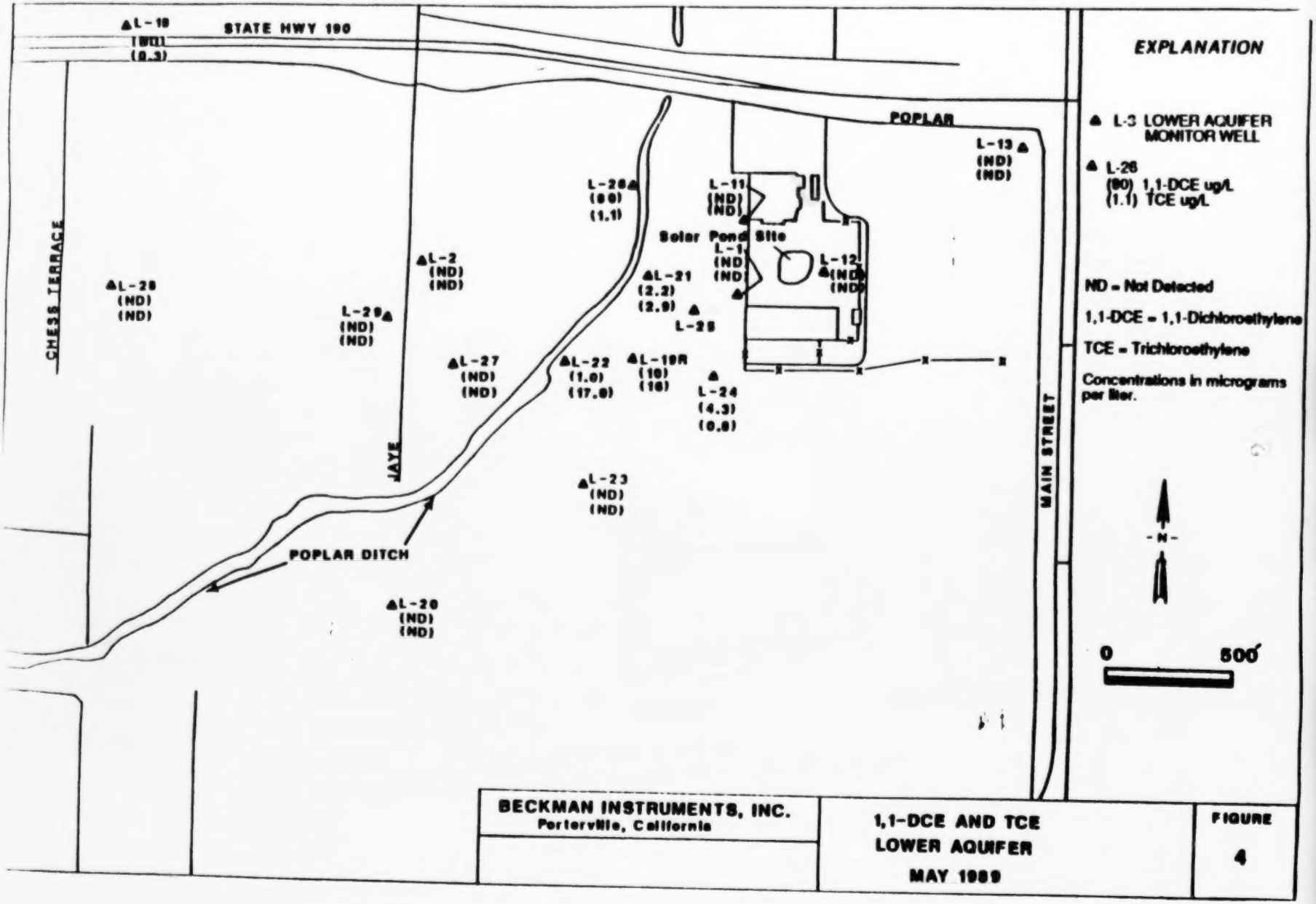

STATE HWY 190
POPLAR
CHESS TERRACE
JAYE
MAIN STREET
POPLAR DITCH
Solar Pond Site
AQ-10 (32.5) (0.3)
AQ-12 (14.5) (0.6)
AQ-2 (88.3) (4.8)
AQ-4
AQ-7 (0.2) (ND)
AQ-9 (33.8) (4.7)
AQ-11 (65.3) (3.2)
AQ-5 (11) (2.3)
AQ-1 (325) (4.3)
AQ-3 (2.1) (0.2)
AQ-6 (0.7) (0.3)
EXPLANATION
AQ-1 UPPER AQUITARD PIEZOMETER SET
AQ-1 (325) 1,1-DCE ug/L (4.3) TCE ug/L
ND = Not Detected
1,1-DCE = 1,1-Dichloroethylene
TCE = Trichloroethylene
Concentrations in micrograms per liter.
Note: Values represent average of concentrations from the shallow and deep piezometers at each location.
N
0
500'
BECKMAN INSTRUMENTS, INC.
Porterville, California
1,1-DCE AND TCE
UPPER AQUITARD
MAY 1989
FIGURE
3

TABLE 2

CONSTITUENTS DETECTED ABOVE BACKGROUND LEVELS IN SITE SOIL
(milligrams per kilogram)

Inorganics	Maximum Concentration
Arsenic	19.6
Cadmium	1.4
Total Chromium	152.0
Copper	670.0
Cyanide	0.66
Fluoride	74.0
Lead	1,280.0
Manganese	472.0
Mercury	0.49
Molybedenum	1.4
Nickel	14.1
Silver	1.0
Sodium	980.0
Tin	478.0
Zinc	460.0

Organics	Maximum Concentration
Aroclor-1254	1.7
Benzo(b)fluoranthene	0.24
DDT	0.36
DDE	0.55
DDD	0.37
Pyrene	0.20
4-Methyl-2-Pentanone	0.07
Toluene	0.013
Total Xylenes	0.025



BECKMAN INSTRUMENTS, INC. Porterville, California	1,1-DCE AND TCE LOWER AQUIFER MAY 1989	FIGURE 4

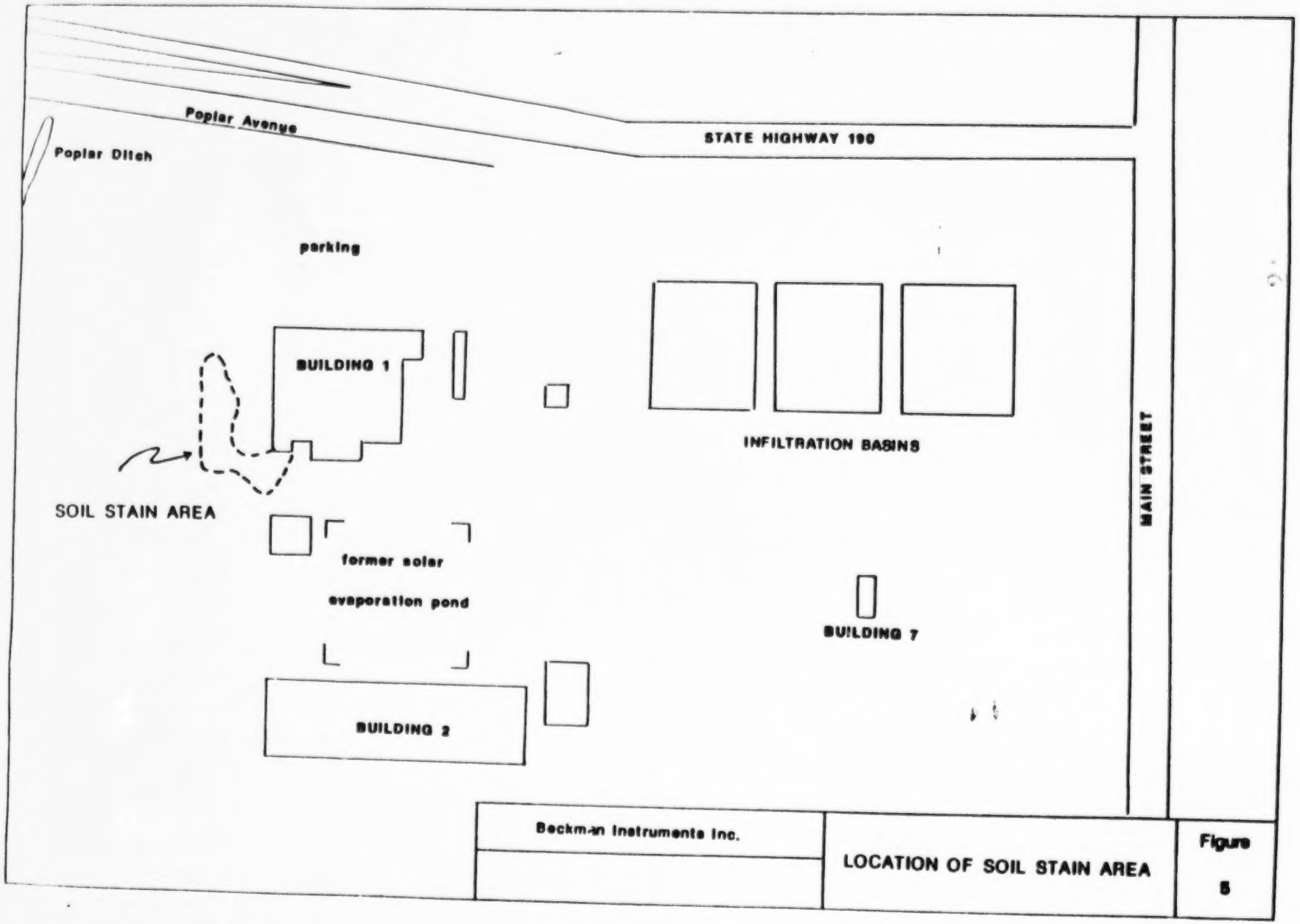

Poplar Avenue
Poplar Ditch
STATE HIGHWAY 190
parking
BUILDING 1
INFILTRATION BASINS
MAIN STREET
SOIL STAIN AREA
former solar
evaporation pond
BUILDING 7
BUILDING 2
Beckman Instruments Inc.
LOCATION OF SOIL STAIN AREA
Figure
5

TABLE 3

TOXICITY VALUES FOR BECKMAN SITE CONTAMINANTS[1]

Site Contaminant	CAS No.	Oral CPF	WOE	Inhalation CPF	WOE	Oral AIC	Inhalation AIC
1,1,1-TCE	71-55-6	-	-	-	-	0.54	6.30
1,1-DCE	75-35-4	0.6	C	1.16	C	0.009	0.00025
TCE	79-01-6	0.011	B2	0.0046	B2	0.543	0.000039
1,1-DCA	75-34-3	-	-	-	-	0.12	0.138

[1] All data from the Endangerment Assessment for the Beckman Instruments site.

CPF = Cancer Potency Factor, expressed as $(mg/kg/day)^{-1}$

WOE = Weight of Evidence

AIC = Acceptable Chronic Intake

and the environment. The results of the baseline risk assessment will help establish acceptable exposure levels for use in developing remedial alternatives in the FS".

EPA prepared an Endangerment Assessment (EA), also called a Risk Assessment, to evaluate risks which may be posed by the "no action" scenario (document #212 in the Administrative Record). Because on-going treatment systems have been operating at the site since 1985, a true "no-action" scenario is impossible to determine. For this reason, August, 1986 was chosen as the date which would simulate the no action scenario. It was assumed that the pump and treat system was shut off and contaminants were allowed to migrate downgradient as would occur if no remediation had been taking place. The EA follows the procedures required by the Superfund Public Health Evaluation Manual.

The Endangerment Assessment process consists of several steps. The first step is contaminant identification. This EA identified a number of compounds that, because of their toxicity or other health risks, are identified as contaminants of concern for the site. At this site, VOCs in groundwater and lead in soils are the main compounds of interest. These chemicals and their maximum concentrations are presented in Table 1.

The second step in the Endangerment Assessment process is to identify the fate and transport of the contaminants identified in step one to assess the pathways of human or environmental exposure. The primary contaminants of concern are VOCs in groundwater (both upper and lower aquifers) and lead in soils. The identified exposure pathways for groundwater include ingestion (of contaminated groundwater, fish, beef and crops), inhalation (due to showering and other household activities) and dermal contact. It must be noted that these pathways are only applicable to the no-action scenario. Since the treatment systems have been operating in the upper aquifer, no contamination has reached the Tule River and domestic use of the groundwater ceased in 1985 when Beckman connected affected households to a public water supply. Thus, ingestion of fish, beef and crops and groundwater would pose a risk only if the no-action alternative were selected.

The exposure pathways for lead-contaminated soil include dermal contact and inhalation of contaminated dust.

The EA concluded that the exposure scenarios presenting the highest risk under the no action alternative were direct consumption of contaminated groundwater and inhalation of contaminants volatilized from water while showering.

The third step of the EA is the Toxicity assessment. Chemicals present at this site include both carcinogens and non-carcinogens. Two contaminants are of concern based on their potential ability to cause cancer: TCE is a Group B2 agent, Probable Human Carcinogen, and 1,1-DCE is a Group C agent, Possible Human Carcinogen. These classifications are based on

the strength of scientific evidence that these agents may be carcinogenic. For TCE, there is sufficient evidence of carcinogenicity in animals and inadequate evidence the compound is carcinogenic in humans. For 1,1-DCE, there is only limited evidence the compound is carcinogenic in animals and the available evidence on humans is inadequate. Chemicals which have been proven to cause cancer in humans are classified as Group A agents, Known Human Carcinogens. Cancer Potency Factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group (CAG) for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals (see Table 3 for toxicity information). CPFs which are expressed in units of mg/kg-day are multiplied by the estimated intake of a potential carcinogen in mg/kg/day to provide an upper bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risks highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Several non-carcinogenic chemicals have been identified to be chemicals of concern at this site. Reference doses (RFDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. The reference dose is an estimate, with an uncertainty of perhaps an order of magnitude, of a lifetime daily exposure for the entire population (including sensitive individuals) that is expected to be without appreciable risk of deleterious effects. Estimated intake of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RFD. RFDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effect on humans). These uncertainty factors help ensure that the RFDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

The last step in the Endangerment Assessment process is the Risk Characterization. At this point the information from the proceeding steps is combined to determine if an excess health risk is present at the site. Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factors. These risks are probabilities that are generally expressed in scientific notation (e.g., 1x10-6). An excess lifetime cancer risk of 1x10-6 indicates that, as a plausible upper-bound, an individual has a one in one million chance of developing cancer as a result of site exposure to a carcinogen over a seventy year lifetime under the specific exposure conditions at a site.

The EA estimated that the lifetime cancer risk to the maximally exposed individual who drinks and showers with water from the upper aquifer (containing concentrations of carcinogens present in August, 1986) is approximately 6 chances in 10,000 or 6x10-4. Because the pump and treatment system has been operating since August, 1986 to decrease the concentrations of carcinogens in the groundwater, the associated risks are decreasing. Drinking and showering are the exposure pathways which are associated with excess risk (greater than 10-6). This cancer risk is primarily from DCE (a class C carcinogen). The EA also estimated that lifetime cancer risk due to drinking and showering with water from the lower aquifer was about 1.6 chances in 1000 or 1.6x10-3 based on the August, 1986 concentration levels. The aquitard was not used in risk calculations because it is not a productive aquifer and is not expected to provide a significant source of groundwater to domestic wells. However, it is of concern to EPA as a continuing source of contamination. Actual current risks are essentially zero as contaminated groundwater is not currently being used for domestic purposes.

Potential concern for non-carcinogenic effect of a single contaminant in a single medium is expressed as a hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentrations in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminants exposures within a single medium or across media. If the ratio exceeds 1 for any chemical, for any route of exposure, there is presumed to be a risk of non-carcinogenic effects at that exposure point.

The EA concluded the exposure route which has a potential for producing non-carcinogenic effects is showering with DCE-contaminated water at the highest concentrations found in the upper aquifer as of August, 1986. The HI for this chemical via this route is 5.24. All oral and inhalation doses for DCA, 1,1,1 TCA and TCE do not present a risk of non-carcinogenic effects for the exposure scenarios evaluated in the EA.

Lead in soil was also identified as a site chemical of concern that poses a threat to public health and the environment. A soil lead concentration of 1,280 mg/kg was detected. Lead contaminated soil poses a health risk through direct contact, inhalation, and ingestion routes of exposure. EPA has determined that lead soil concentrations exceeding 200 mg/kg pose a significant health threat to children and other segments of the human population, and thus has been selected as the cleanup level for lead in soils. Prevention of direct contact and elimination of dust production is a primary remedial objective for contaminated soils.

VII. DESCRIPTION OF ALTERNATIVES

To facilitate the detailed analysis of alternatives, the site was separated into three areas for remedial purposes. These three areas are: (1) upper aquifer; (2) lower aquifer and upper aquitard; and (3) lead-contaminated soils. The remedial alternatives for these three areas are described below.

Upper Aquifer Remedial Alternatives

Five alternatives were evaluated for groundwater contamination in the upper aquifer. These include no action (alternative G-1); institutional controls (alternative G-2); groundwater collection, air stripping treatment, and discharge (alternative G-3a); groundwater collection, carbon adsorption treatment, and discharge (alternative G-3c); and, groundwater collection, carbon adsorption treatment and reinjection (alternative G-4).

The no action alternative (G-1) represents baseline conditions against which other alternatives are compared. Under no action, unrestricted access would be allowed to the upper aquifer and the existing pump and treatment system would be terminated.

Alternative G-2 (institutional controls) would consist of continued monitoring of groundwater quality and restricting access through controls on pumping and new well installation. Existing containment and treatment would cease.

Alternative G-3 (collection, treatment, and discharge) consists of a combination of pumping wells to collect groundwater, treatment of groundwater to remove volatiles, and discharge to existing infiltration basins or irrigated fields. The existing extraction wellfield would be used to collect groundwater. Treatment would be either through air stripping or carbon adsorption. The air stripping alternative is identified as alternative G-3a and the carbon adsorption option as G-3c.

Alternative G-4 (collection, treatment and reinjection) would consist of collection, treatment and recharge of treated water using the existing extraction wellfield, carbon adsorption treatment, and recharge through injection wells.

Lower Aquifer and Upper Aquitard

Six remedial alternatives were evaluated for the lower aquifer and upper aquitard. These include the no action (alternative LG-1); institutional controls (alternative LG-2); extraction, treatment, and recharge of upper aquitard only (LG-3); extraction, treatment, and recharge of lower aquifer only (LG-4); combined extraction, treatment, and recharge of upper aquitard and lower aquifer (LG-5); and, upper aquitard in-situ bioremediation (alternative LG-6).

The no action alternative (LG-1) represents the baseline conditions against which the other alternatives are compared. Under no action unrestricted access to the aquitard and lower aquifer will exist and no attempts to remove or contain the contaminated aquifer will be made.

Alternative LG-2 (institutional controls) would include continued monitoring of groundwater quality, installation of additional monitoring wells, and preventing access to contaminated groundwater through restrictions on pumping and well installation.

Alternative LG-3 (upper aquitard extraction, treatment, and discharge) would involve installation of an extraction wellfield with wells screened into the upper aquitard, treating extracted groundwater in the existing air stripping system, and discharging the treated water into the existing infiltration basins or irrigated fields. Alternative LG-3 involves remediation of the upper aquitard only.

Alternative LG-4 (lower aquifer extraction, treatment, and discharge) would involve installation of an extraction wellfield with wells screened in the lower aquifer, treating extracted groundwater in the existing air stripping system, and discharging the treated water into the existing infiltration basins or irrigated fields. Alternative LG-4 involves remediation of the lower aquifer only.

Alternative LG-5 (lower aquifer and upper aquitard extraction, treatment, and discharge) would involve installation of extraction wells screened into both the upper aquitard and lower aquifer, treating extracted groundwater in the existing air stripping system, and discharging the treated water into the existing infiltration basins or irrigated fields.

Alternative LG-6 (in-situ bioremediation) consists of in-situ aerobic bioremediation of the aquitard and would include an injection system, an extraction system, and a surface treatment facility.

Soil Remediation

Three remedial action alternatives were developed for the lead-contaminated soil. These include no action (alternative S-1); excavation and disposal (alternative S-3); and excavation, treatment, and disposal (alternative S-4).

The no action alternative (S-1) forms the basis against which the other alternatives are compared. Under no action, no remedial action would occur and unrestricted access to contaminated soils would be allowed.

Alternative S-3 (excavation and disposal) would consist of excavation and offsite disposal at a hazardous waste facility of contaminated soil. No treatment to reduce toxicity, mobility, or volume would be performed.

Alternative S-4 (excavation, treatment, and disposal) would consist of excavation, on-site treatment, followed by offsite disposal at an appropriate facility. Treatment would consist of cement solidification or silicate-based stabilization. Treatability tests would be performed during the remedial design to determine the most appropriate treatment. The treated soil could then go through waste characterization and delisting which could allow its disposal as non-hazardous.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section presents a comparison of alternatives using nine component criteria. These criteria, which are listed below, are derived from Section 300.68(h)(2) of the National Contingency Plan; CERCLA Sections 121(b) and 121(c).

1. Protection of human health and the environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
3. Reduction of toxicity, mobility, or volume
4. Long-term effectiveness and permanence
5. Short-term effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance

Under Section 121 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), the basic cleanup objective is to chose a remedy that is protective of public health and the environment, that is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Section 121(d) also requires that remedial actions comply with ARARs. ARARs for this site have been identified in the Administrative Record (Document #78) and are discussed in Section 1.5 of the Feasibility Study. In particular, MCLs under the Safe Drinking Water Act are considered ARARs for this site and have been selected as cleanup goals (see Section on The Selected Remedy). Other significant ARARs include requirements under the Resource Conservation and Recovery Act and State requirements under the Air Resources Act, California Safe Drinking Water act and Porter Cologne Water Quality Act.

Upper Aquifer Remedial Action Alternatives

The no action alternative (G-1) would provide no protection of human health or the environment and would not employ treatment to reduce toxicity, mobility, or volume. Contaminants would continue to move in the environment and would disperse and degrade using natural mechanisms. Because the existing pump and

treatment system would cease to operate, the volume of contaminated media would increase while advection and dispersion occurred. The no action alternative would not comply with ARARS. The alternative offers no short-term effectiveness, but because natural advection and dispersion of contaminants will reduce groundwater concentrations to MCLs in an estimated 1 to 2 years, the alternative does offer limited long-term effectiveness. The no action alternative could be easily implemented, it does not involve implementation of a technology, and would be of minimal cost. The alternative would probably not be acceptable to the state or the community, and would not meet the four statutory determination of a CERCLA remedy.

Implementation of institutional controls and continued groundwater monitoring (alternative G-2) would provide some protection to public health and the environment because access to contaminated groundwater would be limited. Like the no action alternative, contaminants would be allowed to naturally disperse. However the alternative would not employ treatment to reduce toxicity, mobility, or volume. Alternative G-2 would not comply with ARARs. The alternative offers short-term effectiveness only through the effectiveness of enforcement of the institutional controls. It does not meet the criteria of performance or long term effectiveness. Like the no action alternative, concentrations of contaminants in groundwater would achieve MCL goals in 1 to 2 years. Alternative G-2 is perceived to be more acceptable to the State and Community than the no action alternative, but is also perceived to be less acceptable compared to continuation of the present pump and treatment system. Present worth cost for continued monitoring until MCLs are achieved is approximately $594,000.

Continuation of the existing pump and treatment system using air stripping to remove contaminants from extracted groundwater (alternative G-3a) would be protective of public health and the environment through removal and dispersion control of contaminated groundwater. The alternative offers short and long term effectiveness because it is estimated to take less than 1 year for contamination levels to achieve MCL goals. The alternative is readily implementable through use of the existing pump and treatment system. Although air stripping will treat groundwater by reduce volume of contaminated water, air stripping is a media transfer process (water to air) and contaminants are not destroyed. This treatment process has the potential for exposure to site chemicals through inhalation of contaminated air, but all applicable air quality criteria relating to VOC emissions will be met. The present air-stripping treatment system has been permitted by the Tulare County Air Pollution Control District (TCAPCD). Although this is a non-attainment area, the current air emissions for the site meet EPA national policy levels of 15 pounds per day or less. The alternative will address all ARARs for the site. Present worth cost to achieve MCL goals is $571,000. Alternative (G-3) is perceived to be more acceptable to the State and local community than the no action alternative.

Alternative G-3c would employ activated carbon to remove VOCs from extracted groundwater. Alternative G-3c would offer greater public health protectiveness than G-3a because VOCs would not be released into the air. Treatment using carbon adsorption would further reduce mobility and volume of contaminated media. The alternative would take approximately 1 year to achieve MCLs in the contaminated upper aquifer. Alternative G3-c would have higher costs than G3-a due to the need to handle, reprocess, or dispose of the carbon adsorption media. Present worth costs are estimated at $1,186,000. The alternative would comply with all ARARs and would be readily implementable. The alternative is perceived to be acceptable to the State and local community.

Lower Aquifer/Aquitard Remedial Alternatives

The no action alternative (LG-1) would offer no protection to public health and the environment. It would not be effective in reducing mobility or volume of contamination and it would take an estimated 200 years for natural dispersal and degradation mechanisms to reduce aquifer/aquitard concentrations to below MCLs. The no action alternative would not comply with ARARs. The alternative is implementable and would be of minimal cost. The alternative is not likely to be acceptable to the State or local Community, and would not meet the four statutory criteria for a CERCLA remedy.

The institutional control alternative (LG-2) would offer some protection to public health, but effectiveness would be related to the effectiveness of the controls. Because the alternative relies on natural dispersal and degradation mechanisms to achieve MCLs, institutional controls would need to be enforced for more than 200 years. Implementation of institutional controls for 200 years has never been tested or proven for a waste disposal site, therefore implementability is unknown. The alternative does not employ a technology to reduce toxicity, mobility, or volume of contamination. Volume of contaminated media would increase as the VOCs continued to move unabated in the aquifer. The alternative would not comply with ARARs. The alternative is believed to be unacceptable to the State and local community.

Alternative LG-3 (upper aquitard extraction, treatment, and discharge) would consist of extracting and treating water removed from the upper aquitard in the existing air stripping unit. This alternative addresses the upper aquitard which is the source of contamination for the lower aquifer, but would not be effective in remediating the lower aquifer which is a drinking water source. The alternative offers minimal short-term public health protection for the lower aquifer because the lower aquifer would remain contaminated for 100 to 150 years. Long-term effectiveness would be achieved only through natural processes. The alternative would reduce mobility and volume of contaminated media in the aquitard, but with the exception of source control, it would not be effective for the lower aquifer. Treatment via air stripping is a media transfer process and contaminants would

not be directly destroyed through treatment. It is expected that the TCAPCD would permit these air releases. ARARs would be achieved for the aquitard only. Present worth costs for this alternative are estimated at $4,178,000. The alternative is implementable through available groundwater recovery technologies and the existing air stripping system. Treated water would be discharged to the on-site infiltration basins and/or used for local agricultural irrigation. State and community acceptance is perceived to be low due to the length of time the lower aquifer would remain contaminated.

Alternative LG-4 (lower aquifer extraction, treatment, and discharge) consists of extraction and treatment of lower aquifer groundwater using the existing air stripping system. Treated water would be discharged to the on-site infiltration basins and/or used for local irrigation. The alternative addresses the lower aquifer which is a drinking water source, but would not remedy the aquitard, which is the source of contamination for the lower aquifer. The alternative would offer some protection of public health through containment of the plume. Short-term effectiveness would be dependent on plume control and prevention of access to the contaminated portion of the aquifer. Long-term effectiveness is estimated to be achieved in 30 to 40 years when contaminant concentrations in the aquifer are predicted to be reduced to MCLs. The alternative would control movement and contain the volume of contaminated groundwater. Treatment via air stripping is a media transfer process and contaminants would not be destroyed by direct treatment. It is expected that the TCAPCD would permit the air releases. ARARs would be addressed by alternative LG-4. Present worth cost for alternative LG-4 is estimated at $3,344,000. The alternative is perceived to be less acceptable to the State and community than alternative LG-5 which would produce reduced remediation time due to concurrent lower aquifer/aquitard remediation.

Alternative LG-5 (concurrent upper aquitard/lower aquifer extraction, treatment, and discharge) is a combination of alternatives LG-3 and LG-4. This alternative offers greater public health protection through control of the source and contaminant plume. The alternative is estimated to achieve MCLs in the lower aquifer in approximately 25 years and would be effective in the long term. Short-term effectiveness would be related to control of emissions from the air stripping system and control of access to the aquifer. The alternative is easily implemented using available groundwater extraction technology and could use the existing air stripping system. The treated water would be discharged to the infiltration basins and/or used for irrigation. The alternative would effectively reduce mobility and volume of contaminated media. Treatment would be a media transfer process and contaminants would not be directly destroyed. It is expected that the TCAPCD would permit the air releases. Present worth cost is estimated at $3,928,000. The alternative is perceived to be acceptable to the State and local community.

Alternative LG-6 (in-situ bioremediation) would consist of aerobic bioremediation of contaminated portions of the aquitard. The alternative would require treatability studies and it is not known whether it could be implementable. The alternative would be effective for the aquitard, and would address the aquifer only through reduction of release of VOCs into the lower aquifer. The time period of remediation is not known, but the remedy may take up to 100 years to achieve ARARs in the lower aquifer. Short-term effectiveness would be related to the ability to prevent access to the lower aquifer. The alternative could result in reduction of toxicity, mobility, and volume of contaminated groundwater. Costs for implementation are unknown. Due to the uncertainties associated with the alternative, the alternative is not perceived to be acceptable to the State and the local community.

Soils Remedial Alternatives

Alternative S-1 (no action) would allow unrestricted access to the area with soil contamination and therefore offers no public health protection. Because contamination would remain indefinitely, the no action alternative would not be effective in the short or long terms. No action would not employ treatment to reduce toxicity, mobility, or volume. The alternative is readily implementable and costs would be minimal. The alternative is perceived to be unacceptable to the State and local community.

Alternative S-3 (excavation and off-site disposal) would be easily implemented, provide immediate (short term) protection of public health, and provide long-term effectiveness for the site. The alternative would comply with ARARs including the Land Ban Restrictions. Since disposal occurred prior to November, 1980, the lead-contaminated soil would not be considered a listed RCRA waste, however, it may be a characteristic waste. It will be determined during remedial design whether or not the lead contaminated soil is a characteristic waste. If it is determined to be a RCRA waste, then Land Ban would be considered an ARAR and would be complied with. The alternative would not employ treatment to reduce toxicity, mobility, or volume, and the contamination problem would be transferred to a landfill facility. The cost for alternative S-3 is estimated at $241,054, which comes primarily from the landfill disposal fee of 740 cubic yards of contaminated soil estimated in the FS. Beckman has stated that this is a worst case estimate, and that the actual volume of contaminated soils may be much less. The remedy is perceived to be acceptable to the State and the community.

Alternative S-4 (excavation, treatment, and off-site disposal) would provide the same public health protectiveness and effectiveness as Alternative S-3 for the site. The use of stabilization as a treatment, however, provides additional protection for the landfill receiving the stabilized soil mass. The stabilized soil mass may be able to be reclassified as non-hazardous allowing disposal at a non-hazardous waste facility. Treatment would reduce contaminant mobility, but the

volume of contaminated soil would be expected to increase by 30% to 50%. The alternative is easily implementable. Cost is estimated at $291,554, which is approximately $50,000 more than Alternative S-3 due to treatment costs. The cost of this remedy is based on estimates in the FS which may overestimate the volume of contaminated soil. The remedy is perceived to be acceptable to the State and local community.

IX. THE SELECTED REMEDY

Upper Aquifer

The selected remedy for the upper aquifer is alternative G-3. This alternative consists of continuation of the existing Beckman extraction, treatment, and discharge systems. The system has been treating groundwater since 1985 and has been shown to be effective in reducing contamination levels in the upper aquifer. The alternative offers significant short-term public health protectiveness, is estimated to take less than one year to reduce contaminant levels to MCLs, and will be a permanent solution for the upper aquifer. The alternative is cost-effective because the treatment system is already in place. Permits for the current discharge of treated water and air emission have already been obtained, although these permits will have to be reviewed upon initiation of treatment for the lower aquifer and aquitard. Completion of the selected remedy will allow unrestricted access to the upper aquifer. The selected remedy complies with SARA's preference for treatment as the principle remedy.

Upper Aquitard/Lower Aquifer

The selected remedy for the upper aquitard/lower aquifer is alternative LG-5, concurrent aquitard/lower aquifer extraction, treatment, and discharge. The alternative would involve installation of extraction wells and treatment of extracted water in an air treatment unit. It is expected that the existing air treatment units will be used, although the existing permits may have to be reviewed and modified. The alternative addresses the source of contamination and the affected aquifer. It is recognized that pumping in the the aquitard may be limited, particularly west of the Beckman plant due to the relatively impermeable nature of the aquitard in this area. The location of pumping wells and extraction rates will be determined during remedial design. This alternative is expected to achieve public health protection in the least amount of time (about 25 years) and would take advantage of current systems thus making it readily implementable. When complete, the alternative offers a permanent solution for the site. The alternative is cost effective when compared to alternatives that will take up to 100 years to accomplish. Completion of the remedy will allow unrestricted use of the lower aquifer. The selected remedy complies with SARA's preference for treatment.

TABLE 4

CLEAN UP GOALS AND WATER QUALITY CRITERIA
(micrograms per liter)

Site Contaminant	Clean Up Goals	Federal Maximum Contaminant Level	State Maximum Contaminant Level	State Action Level
1,1,1-TCA	200	200	200	200
1,1-DCE	6	7	6	6
Freon 113	1,200	NA	*1,200	1200
1,1-DCA	5	NA	*5	5
TCE	5	5	5	5

*Proposed California State MCL.

Soils

The selected remedy for the lead-contaminated soils is alternative S-3. This alternative involves excavation of contaminated soils and offsite disposal of the excavated soils. The alternative is a permanent solution for the site, allowing unrestricted access to the area of contamination after remediation. Significant public health protection would be achieved. Alternative S-3 was chosen as the remedy for soils based on further review of available data and public comment. Beckman has stated that the estimate of soil volumes in the FS represent a "worst case" scenario and it is expected that the actual volumes of soil and concentrations of lead in soils to be much less than stated in the FS. Based on this information, treatment is not expected to be as cost-effective. In addition, the benefits of treatment (reduction in mobility) is not expected to offset the volumetric increase in contaminated material, particularly since the concentrations of lead are expected to be relatively low [less than or equal to 1280 ppm]. Although the preference for treatment as a principle component of the remedy would not be satisfied, these factors have led EPA to choose alternative S-3 as the selected remedy. This alternative is cost-effective. In the event that additional information collected during sampling in the Remedial Design suggests that the original volume estimates are correct and/or concentrations of contaminants are much greater than originally expected, this decision will be reevaluated, as treatment may be the most appropriate remedy in that case.

Cleanup Goals

EPA has selected federal Maximum Contaminant Limits (MCLs) as the cleanup goals for the groundwater in the upper and lower aquifer. Where State MCLs are more stringent, EPA has selected State MCLs, as in the case of 1,1-DCE. For those chemicals which do not have State or Federal MCLs established, as in the case of Freon 113 and 1,1-DCA, EPA has selected State action levels as the cleanup goals. The selection of MCLs as cleanup goals is consistent with the National Contingency Plan and EPA policy. The cleanup goals are presented in Table 4.

The aquitard underlying the Beckman site is recognized to be a variable unit ranging from relatively impermeable clays to the west of the plant and grading to much coarser and relatively more permeable silts, sands and clays in the vicinity of the Beckman plant. The aquitard is recognized to be a source of contaminants in the study area. In the vicinity of the Beckman plant, the aquitard may also be capable of supplying water to wells and thus may be available for human consumption and irrigation. Therefore, the objective is to remedy the aquitard to prevent migration into the lower aquifer and to prevent consumption of contaminated aquitard waters which may present an endangerment to public health and the environment. The remedy specified in this Record of Decision is pumping and treating of all three units, to the extent practicable. The cleanup goals specified are MCLs for

all contaminants identified as compounds of concern. It is recognized that cleanup goals may not be able to be achieved in the more impermeable zones of the aquitard and that some combination of institutional controls may need to be implemented in the future. This decision will be reviewed after the remedy has been in place five years to determine the feasibility of cleaning up the aquitard to MCLs.

For lead-contaminated soils, EPA has selected a cleanup level of 200 ppm to protect public health and the environment.

X. STATUTORY DETERMINATIONS

The selected remedy will comply with all ARARs and, to the extent practicable, the requirements of Section 121 of CERCLA. The remedy will be protective of public health and the environment through removal and containment of a significant quantity of contaminated media. Implementation of the remedy will not pose unacceptable short-term risks.

The selected remedy will meet all ARARs for VOC release, dust emissions, and land disposal. The selected remedy is cost effective and makes maximum use of existing treatment systems. The remedy offers the greatest site area health protection at moderate cost. Risk reduction through the other alternatives was either significantly less than the selected remedies, or was achieved at significantly higher cost.

The selected remedy will result in permanent solutions for the site, allowing site groundwater to be returned to productive use. Contaminated soil will be excavated and removed to an offsite facility where long-term management can be properly achieved.

The selected remedies for groundwater meet statutory preferences for treatment as the principle remedy. Air stripping will remove VOCs from groundwater allowing productive use of the treated water and will achieve a reduction of toxicity, mobility or volume of contaminants in the groundwater.

For any soils taken off-site, long-term maintenance of the disposal facility will be a requirement for the contaminated soils. Treatment will probably not be required for lead-contaminated soils, as the small volume and relatively low levels of contamination do not make treatment a cost-effective component of this remedy.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Beckman Instruments Site was released in June 1989. The Proposed Plan identified pumping, treatment, and disposal of treated water to infiltration basins as the selected remedies for the upper aquifer and the upper

aquitard/lower aquifer. The Proposed Plan also identified soil excavation, stabilization, and off-site disposal for lead contaminated soils. EPA has reviewed all comments submitted verbally and in writing during the public comment period and has decided to change a portion of the remedy as described in the Proposed Plan. EPA has decided that selection of Remedial alternative S-3, (excavation and off-site disposal) would be the most appropriate alternative for remediation of contaminated soils. The reason for this decision is that it appears that the volume of contaminated soil estimated in the FS is significantly high. This is due to the fact that the FS based the cleanup level on 40 ppm lead and this Record of Decision is selecting 200 ppm as the cleanup goal. In fact, a much smaller volume of soil may be contaminated above 200 ppm. Only one soil sample (at 1280 ppm lead) showed contamination above this cleanup level. Lead contamination in soils above 1000 ppm is considered to be hazardous waste in the State of California, below this level it is a "designated" waste. By treating the soils with a silicate based cement additive, the volume of soils would increase by 30 to 50 percent. Due to the relatively low concentrations expected to be found, it was determined that the stabilization (reduction in mobility) was not sufficient to warrant this volumetric increase. Limited additional sampling will be required to confirm the extent of contaminated areas. In the event that concentrations of lead significantly higher than 1000 ppm and/or volumes of contaminated soil as described in the FS are discovered, and treatment may be included the most appropriate alternative in that case.

EPA has also reviewed the groundwater cleanup goals identified in the Proposed Plan for achievement of the remedial action. In the Proposed Plan EPA identified 0.5 ug/L as the cleanup goal for any of the VOCs detected in the lower or upper aquifers. However, after consideration of the public comments received, and after review of the protectiveness afforded by a 0.5 ug/L level and the protectiveness afforded by MCLs for each individual VOC, EPA has elected to change the cleanup goals for each VOC to its respective State and/or Federal MCL. Cleanup goals for each of the VOCs are shown on Table 4. EPA has determined that clean up of both aquifers to MCLs will provide adequate protection to public health and the environment and therefore is making this change in this Decision Document.

BECKMAN INSTRUMENTS
PORTERVILLE, CALIFORNIA
RESPONSE SUMMARY

A. OVERVIEW

EPA issued a Proposed Plan for the Beckman Instruments Superfund site on June 12, 1989, initiating a 37 day public comment period. The Proposed Plan described EPA's preferred alternative for groundwater and soil contamination remedies at this site. The Proposed Plan was issued in the form of a fact sheet that was mailed to Porterville community members and local leaders on June 8, 1989. EPA's preferred alternative, as described in the Proposed Plan, involved excavation, treatment and disposal of lead-contaminated soils and pumping, treatment (using air stripping) and discharge of contaminated groundwater. The treated groundwater would be used for irrigation or returned to the upper aquifer via infiltration basins. The Proposed Plan addressed groundwater contamination in the upper and lower aquifers and the intervening aquitard.

EPA held a public meeting on June 22, 1989 at the Porterville City Hall to discuss the Proposed Plan. The meeting was well attended and generated many questions and formal comments. EPA also received many written comments during the public comment period. Judging from the written and oral comments EPA received, the majority of community members and local government leaders who responded generally agree with the recommended methods of addressing the remaining contamination problems at the Beckman site. However, these commentors disagreed with EPA's proposed clean-up goals for the site's groundwater units as well as EPA's Endangerment Assessment, which assessed Site risks under the "No-Action" remedial alternative.

Most commentors said that they believed the clean-up goals, set more stringent than drinking water standards, were unrealistic, unnecessary and unfair to Beckman. Many commentors questioned the benefits to be gained by achieving more stringent clean-up goals. These commentors also emphasized the economic hardships the Porterville community could endure as it retained the "contaminated" stigma throughout the 15-25 years needed to achieve these clean-up goals. The impacts cited most often included the perception by consumers that produce and animal products from the area might be unsafe to consume and the disincentive created to industries considering moving to the Porterville area.

Most commentors cited fairness as a key issue to be considered by EPA in dealing with Beckman whom they perceive to be an active, responsible corporate citizen. Several commentors also questioned EPA's credibility in light of some controversial aspects of EPA's Endangerment Assessment.

The comments received by EPA during the public comment period have been addressed in this summary. This summary contains the following sections:

- Background on Community Involvement
- Summary of Comments Received During the Public Comment Period and EPA's Responses
- Remaining Concerns
- Attachment: Community Relations Activities at Beckman Instruments

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Beckman Instruments site began during the summer of 1983. The community first learned of the contamination problem through media coverage of a joint press conference held by Beckman, the Regional Water Quality Control Board (Regional Board or RWQCB) and the California Department of Health Services (DHS). This press conference described the groundwater and residential water well contamination discovered by Beckman's sampling and analysis program. Residents in areas affected by the contamination were also contacted directly by mail by both DHS and Beckman. Some of these residents received the initial news of the contamination with widespread concern. In August 1983, some neighborhood members organized a meeting of property owners and residents to discuss common concerns. This meeting led to the formation of a group, dubbed the "Freon Flats Action Committee" (FFAC), whose goals were to learn more about site contamination and its consequences and to influence government decision-makers regarding the actions that should be taken to address the problem. The FFAC met frequently during the latter half of 1983. The FFAC met less frequently following connection of affected households to the Porterville city water system which was completed by December 1983. Active community interest in the Beckman site continued to wane though increased briefly following the June 1984 discovery of contamination affecting additional residential areas. These residents were then provided with bottled water and city water connections. As a result, active community interest has remained relatively low through the present time.

Major concerns expressed by community members over the past six (6) years have included concerns regarding:

o Potential Spread of Contamination - The threat of future contamination of private and city water wells; had the source of contamination really been stopped?

o Health Affects Related to Contamination of Private Wells - especially the dangers to sensitive populations such as young children and older residents; risks associated with consuming produce or animal products that ingest the contaminated groundwater.

o Impact on Porterville Economy - The negative image and fear created by the "contaminated" stigma and its impact on the city's ability to attract new industries and promote its agricultural products.

o Positive Attitude Toward Beckman - widespread community belief that Beckman was a good corporate citizen and had done an excellent job of addressing its groundwater contamination problems; concern that if clean-up methods became too costly, Beckman might close its Porterville plant which would be a tremendous loss to the city.

EPA has sought to address these and other Porterville community concerns by doing the following:

Presenting information to community members regarding the status of Beckman Superfund activities - EPA prepared a Community Relations Plan which described all planned community out-reach activities. EPA attempted to keep the community informed by preparing and distributing two (2) fact sheets and one (1) fact sheet update. EPA also established a local repository at the Porterville City Library for site-related materials for public review.

Provided opportunities for two-way communication between EPA and the community - EPA distributed fact sheets which encouraged community members to ask questions and make comments by calling EPA's toll-free telephone number. EPA conducted meetings in early June, 1989 with civic leaders and a public meeting on June 22, 1989 to answer questions and receive the community's comments regarding EPA's Proposed Plan for addressing the remaining site contamination.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

The public comment period for the Beckman Instruments site was held from June 12, 1989 through July 18, 1989. The public comment period was originally scheduled to close on July 11, 1989 but was extended one week by EPA in response to requests received from Beckman and others. During the public comment period, EPA received a total of forty (40) comments regarding the draft Feasibility Study (FS) and EPA's Proposed

Plan for cleaning up the remaining site contamination. EPA received nine (9) verbal comments at the public meeting held in the Porterville City Hall on June 22, 1989, and thirty-one (31) written comments thereafter. Two (2) comments were received after the close of the formal public comment period and are included in this Response Summary as well. Five (5) commentors submitted both verbal and written comments. Comments raised during the public comment period are summarized below and are categorized by relevant topics.

REMEDIAL ALTERNATIVE PREFERENCES

Relatively few of the comments received during the public comment period dealt with the choice of specific remedial alternatives. Of the comments that were received in this category, most addressed concerns regarding EPA's preferred alternatives for addressing contamination of the soils and the aquitard/lower aquifer.

Upper Aquifer

1. California Department of Health Services, Toxic Substance Control Division (DHS) expressed general concurrence with EPA's proposed approach for addressing site contamination and stated that they consider the proposed actions to be protective of human health and the environment. DHS also had other specific comments which will be addressed later in the summary. The Regional Water Quality Control Board (RWQCB or Board) also expressed concurrence on selection of alternative G-3(a).

EPA Response: EPA agrees with and acknowledges the comments.

2. Beckman Instruments (Beckman) and the Tulare County Department of Environmental Health (DEH) concurred with EPA's proposal to continue using the existing pump, treat and discharge technology (including air stripping) to address the remaining contamination in the upper aquifer. Beckman and DEH commented that this technology has proven itself to be a technically sound and effective treatment method. DEH also emphasized that the necessary components are in place and that the community is familiar with this treatment method and has confidence in it.

EPA Response: EPA agrees with and acknowledges the comments.

3. Two (2) residents commented that they fully agree with EPA's Proposed Plan for Beckman. They stated that they were very concerned regarding the spread of contamination in the lower aquifer toward them. They said it was unfortunate that

more people who live in the unincorporated area around the project were either unaware or unwilling to attend the public meeting.

EPA Response: **EPA agrees with and acknowledges the comment.**

4. Beckman stated that EPA's Proposed Plan lacks a description of the specific criteria to be used to determine when the remedial action has been completed. Beckman proposed a criterion that would call for them to continue operating the pump and treat system for six (6) months after the concentration of 1,1 Dichloroethylene (DCE) in the upper aquifer drops to or below the selected clean-up goals. Monitoring of selected wells would then continue for a one-year period thereafter. If DCE concentrations remain at or below selected clean-up goals during that monitoring year, then remediation would be considered complete.

EPA Response: **The purpose of the Proposed Plan is to provide a short summary of the remedial alternatives evaluated in the Feasibility Study for a particular site and to present EPA's preferred alternative for site remediation. The detailed criteria will be determined by EPA following discussions with Beckman.**

Soils

1. Beckman disagreed with EPA's proposal to address lead-contaminated soil at the site. Beckman said that excavation and treatment of this soil was unnecessary. Beckman cited the relatively small volume of soil affected and that EPA's plans are based on the result of one (1) soil sample out of about 200 samples taken. Beckman sited the fact that this one sample was taken at a depth of 1 1/2 feet below the surface in an area already designated by the City of Porterville as a future road site. Beckman said that all of these factors contribute to posing a low risk of human exposure and therefore don't warrant EPA's proposed excavation, treatment and disposal plans.

EPA Response: **EPA's Proposed Plan was based on the results of the Feasibility Study, prepared by Beckman. The FS estimated that approximately 740 cubic yards of soil were contaminated above 40 ppm, the level assumed in the FS to be the clean-up goal. EPA has acknowledged that the volume of soil contaminated above 200 ppm (the cleanup goal set in this ROD) may be much less than estimated in the FS. EPA has therefore selected, conditional upon information determined during remedial design, remedial alternative S-3, Excavation and off-site disposal for remediation of soil contaminated with lead in excess of 200 ppm.**

2. Tulare County DEH commented that they concur with EPA's proposal to excavate and dispose of Beckman's lead-contaminated soil. DEH said, however, that it didn't find

sufficient justification to require soil treatment prior to disposal. DEH believes the health threat posed by these soils to be minimal. DEH said they were uncertain whether the solidified material could be determined to be non-hazardous and, therefore, be disposed of in a Tulare County landfill. DEH stated that the treated material would remain a "designated waste" and DEH has not determined how to treat these classes of wastes.

EPA Response: **EPA acknowledges the comment and has selected remedial alternative S-3, Excavation and offsite disposal as the remedial action.**

3. The RWQCB stated that the constituents detected above background levels do not pose a threat to water quality and that Alternative S-4, excavation, treatment, and off site disposal is an acceptable alternative.

EPA Response: **EPA acknowledges the comment.**

Aquitard/Lower Aquifer

1. Beckman, Tulare County DEH and Congressman Pashayan commented that they believe insufficient data exists to select a remedy or clean-up goal for the aquitard/lower aquifer. DEH said "the data appears scant to warrant committing to a significant course of action". DEH believes the missing data could be obtained relatively quickly and could provide a clearer understanding of the extent of contamination in these zones. Congressmen Pashayan added that while Congress is concerned about expeditious completion of Superfund clean-ups, their primary concern is the overall quality of the work and assuring appropriate and cost-effective remedies.

Beckman stated that the missing information is critical to adequately prescribe clean-up methods and goals. Beckman said that implementation of EPA's proposed remedy without sufficient data could ultimately prevent removal of aquifer contaminants or vastly increase the time necessary to remove them. Beckman cited important missing data which included better definition of the areal extent of aquifer contaminants, the hydraulic relationships between the two aquifers and the aquitard, an evaluation of potential upgradient sources of contamination and the extent to which aquifer contaminants can be stored, transmitted or released in response to pumping in these aquifers and the aquitard. Beckman stated that, following further study, EPA's Maximum Contaminant Levels (MCLs) would presumably be the appropriate clean-up goal for the lower aquifer but this determination could only be made at the completion of further work.

EPA Response: **EPA recognizes that additional work will be required to develop detailed design parameters regarding the remedial action for the aquitard and lower aquifer. EPA disagrees that implementation of EPA's proposed remedy may**

preclude effective implementation of a general remedial action for these units. Of the technologies evaluated in the FS, pumping and treating ground water (pump and treat), no action and institutional controls were the three technologies believed to be feasible at this time. Neither the no action nor the institutional control alternatives are acceptable to EPA, the State Water Quality Control Board and the State Department of Health Services. These alternatives require controlling risks to public health and the environment for several hundred years and they do not comply with Applicable or Relevant and Appropriate Requirements (ARARs). Thus, the only feasible technology at this time appears to be pump and treat. EPA acknowledges that the effectiveness of the remedial action in removing contaminants to cleanup goals is not fully known. The effectiveness of any pump and treat system (except hydrologically ideal systems) can only be determined after the operation of such a system.

2. The RWQCB has stated that Alternative LG-5 is an acceptable approach. However, the RWQCB has recommended that cleanup goals be established for the aquitard as well because the Board staff "...believe that the aquitard is a potential source of water" and that "Waters in the aquitard are waters of the state."

EPA Response: EPA agrees with the Board's conclusions regarding establishing clean up goals for the aquitard. EPA will be discussing this issue with Board staff.

TECHNICAL QUESTIONS/CONCERNS REGARDING REMEDIAL ALTERNATIVES

Most of the comments received during the public comment period addressed concerns in this category, specifically EPA's proposed clean-up goals for groundwater and EPA's Endangerment Assessment (EA).

Proposed Groundwater Clean-up Goals

1. Many commentors expressed the belief that EPA's proposed clean-up goal of .5 ppb for all of the groundwater contaminants at the site is unrealistic, inappropriate and unnecessary to protect public health. They stated that the appropriate clean-up goals should be MCLs. This comment was expressed in one form or another by most of the commentors including Beckman, Porterville's Mayor and Chamber of Commerce, California State Assemblyman Bill Jones, California State Senator Rose Ann Vuich, Tulare County Supervisor Gary Reed, Porterville Civic Development Foundation, TAKARE, Rees Inc., Bank of the Sierra, Congressman Charles Pashayan Jr., and eighteen (18) local residents. Mayor Ensslin said that the .5 ppb clean-up goal requirement was unrealistic and could take 15-25 years to accomplish. Beckman, as well as Assemblyman Jones and Senator Vuich, said that MCLs are fully protective

of human health and the environment as stated in EPA's own guidance documents. Senator Vuich also said that MCLs incorporate an adequate margin of health safety.

EPA Response: EPA has considered these comments and is selecting MCLs as the clean-up goals for this site.

2. Beckman commented that MCLs are the appropriate clean-up goals at this site especially considering the fact that EPA's Maximum Contaminant Level Goal (MCLG) for the Beckman indicator chemical (1,1-DCE) is the same as the MCL for that substance. Beckman considered it is unnecessary to set a clean-up goal lower than EPA's MCLG when the MCLG, by its definition, is the level of the chemical at which EPA has determined it poses no known or anticipated adverse health effect and allows an adequate margin of safety.

EPA Response: EPA has considered these comments and is selecting MCLs as clean-up goals for this site.

3. Supervisor Reed urged EPA to adopt clean-up methodologies and criteria that will assure health and environmental protection while still allowing a measure of reasonableness. Supervisor Reed said he did not feel obligated to force the limits of technology nor does he consider a totally risk-free society attainable.

EPA Response: EPA has considered these comments and believes that selection of MCLs as clean-up goals provides adequate protection to public health and the environment.

4. Tulare County DEH commented that it believed EPA's proposed clean-up goals were extremely conservative. DEH supported setting clean-up goals at MCLs or possibly 10% lower. DEH questioned whether the aquitard sediments would release enough of the contaminants to ever get down to the .5 ppb level in the aquitard and aquifers.

EPA Response: EPA has considered these comments and is selecting MCLs as clean-up goals. The effectiveness of the pump and treat system will be reviewed within five years.

5. Senator Vuich said she would be supportive of clean-up goals more stringent then MCLs (possibly as low as .5 ppb) if research existed that demonstrated significant health benefits due to the lower concentrations. DEH commented that it believes the additional health benefits to be realized due to the .5 ppb clean-up goal vs. MCLs to be more theoretical than actual.

EPA Response: EPA has considered these comments and is selecting MCLs as clean-up goals for this site.

6. Several residents commented to the effect that drinking water standards (MCLs) were sufficient until there was proof of health damage. Several residents voiced the belief that if MCLs are good enough for drinking water and that the city or a

water company can pipe water to them at MCLs, then it should be good enough for the groundwater where, as one person said, "Mother Nature is continually working on it".

EPA Response: EPA has considered these comments and is selecting MCLs as the clean-up goals for this site.

7. DHS commented that it understood 1,2-DCA was also present near the facility. DHS observed that the California MCL (CMCL) for 1,2-DCA is .5 ppb and, as such, they would concur with EPA's proposed clean-up goal. DHS stated, however, that if the presence of 1,2-DCA is found to be insignificant or appears isolated, EPA may want to "review" its proposed clean-up goal.

EPA Response: Although 1,2 DCA has not been selected as a contaminant of concern, it has been detected sporadically at the Beckman site. The source of this contaminant is unknown, however, and additional investigation will be required to determine the source such that clean-up goals can be established at the source.

8. DHS commented that if contaminants remain in the aquitard after cleaning up the upper and lower aquifers, the aquitard may act as a source of continued groundwater contamination. DHS suggested that clean-up goals be applied to the aquitard as well as the upper and lower aquifers. The RWQCB has made a similar comment.

EPA Response: EPA agrees with the comment. Clean-up goals will be applied to all units which are potential drinking water sources. The effectiveness of pump and treat technology in removing contaminants to MCLs will be reviewed within five years.

9. The RWQCB recommended that clean up limits be set at least as low as the federal and state drinking water standards, however they state that final clean up limits be determined after "...consideration of the cost of achieving each additional increment of cleanup below drinking water standards and the benefit to the environment of that increment." They further recommend that "...the upper aquifer be remediated below drinking water standards until it can be demonstrated by Beckman Instruments that benefit to the environment no longer justifies the economics of additional cleanup efforts."

EPA Response: EPA has considered these comments. EPA is selecting MCLs as clean up goals for this site.

Endangerment Assessment

1. Beckman, Tulare County DEH, and several individuals commented to criticize the Endangerment Assessment (EA) for the site prepared by EPA and its contractor. These commentors generally said that the EA is seriously flawed and should be revised. Most commentors said that the materials relied upon in the EA are factually outdated (i.e. the assumed 1986 shut-

down of existing pump and treatment systems) and grossly unrealistic. Several commentors noted that this very admission is stated in the EA itself.

EPA Response: **The Endangerment Assessment prepared for this site follows the procedures and methods specified in the Superfund Public Health Evaluation Manual. EPA is required by the National Contingency Plan (NCP) Section 300.68 (e) & (f) to evaluate the risks to public health and the environment under a "no action" scenario. Because interim remedial action had already begun at this site, it was necessary to select a date at which it was assumed that all on-going treatment systems were terminated and unrestricted access to contaminated groundwater was possible. This date was agreed to by Beckman as August, 1986. The risks developed in the Endangerment Assessment (EA) were therefore maximum risks which could be experienced in the event the current system was terminated. As the public is aware, this system has not been terminated (for the upper aquifer), thus the risk scenarios developed in the EA were not a reflection of actual conditions. However it was necessary to develop these risk scenarios to be consistent with national EPA policy and guidance.**

2. Tulare County DEH commented that the concept of using a risk assessment (here called the EA) analysis is well founded and they strongly support the concept and its objectives. DEH felt the Beckman EA did not provide worthy support or justification to either the concept or the objectives. DEH stated that the rationale for developing a "worst case" scenario and establishing requirements on that basis is defensible and provides for selecting conservative standards or criteria. DEH said that the EA for the Beckman site does not present a credible "worst case", nor does it evidence serious scientific review. DEH observes that "the EA appears to be primarily a compendium of bits of information with implied significance but without discernible support bases. It appears that the report was compiled from cursory literature selections and lacked review by health professionals." DEH recommended the EA be reviewed and reconsidered by health professionals.

EPA Response: **The EA was prepared following EPA Superfund Public Health Evaluation Manual procedures. The EA was reviewed by health professionals including internal review by Labat-Anderson personnel (EPA's contractor who developed this EA), EPA Headquarters and Region 9 toxicology staff and by the Agency for Toxic Substances Disease Registry (ATSDR). All of these professionals are either medical doctors or PhD toxicologists. See also response to comment number 1.**

3. Beckman commented that the EA erroneously treated 1,1-DCE as a carcinogen. Beckman observed that this was contrary to many other official statements by EPA. Beckman cites, in ad-

dition to studies, EPA's work plan for the Beckman site which states on page 2-32 that ". . . EPA considers the data insufficient to classify DCE as carcinogenic."

EPA Response: **EPA has determined 1,1 DCE to be a Class C carcinogen and has developed a Cancer Potency Factor (CPF) for this chemical. The Superfund office at EPA (the Office of Solid Waste and Emergency Response) has developed a policy to treat all carcinogens, regardless of class, as carcinogens and recommends including them in calculations to determine cumulative risks for a particular Superfund site.**

4. Beckman also comments that it believes its Risk Assessment is valid and sound. Beckman questions why its Risk Assessment, which was included with its draft Feasibility Study (FS) for the site was disavowed by EPA without an explanation. Beckman comments that EPA's FS Addendum fails to discuss EPA's basis for disregarding Beckman's findings and that Beckman followed the Public Health Evaluation Manual in preparing its Risk Assessment.

EPA Response: **EPA has determined that the Beckman risk Assessment does not follow the procedures in the Superfund Public Health Evaluation Manual because not all exposure pathways were considered. For example, no inhalation or dermal exposure routes were considered although these routes are a major concern when dealing with volatile organic chemicals (VOCs).**

5. Dr. James Lessinger commented that he has called the "company that put this (EA) together" to verify and get additional information regarding materials cited in the EA and has not had his phone calls returned. He states that he called specifically to get a list of the references that were extracted from TOX-LINE and MED-LINE searches as stated in the EA.

EPA Response: **The EA was released by the Environmental Protection Agency. Any additional information can be obtained by contacting Carolyn Thompson at EPA's Regional Office in San Francisco, CA.**

OTHER IMPACTS

Beckman has commented that EPA, in formulating its Proposed Plan for the Beckman site, has failed to evaluate the additional implications of setting clean-up goals less than MCLs including the economic impacts on the community and the precedential effect on other Superfund and state lead sites.

Economic Impacts

1. Porterville's Mayor and Chamber of Commerce as well as Supervisor Reed, Senator Vuich, the Bank of Sierra and at least six (6) other residents commented on the negative

economic impact to the Porterville community that would be caused by EPA's Proposed Plan, in particular its proposed groundwater clean-up goals. Most commentors said that the length of time necessary to achieve these clean-up goals as well as the negative image associated with a community with groundwater contamination problems would cause residents and businesses in and around Porterville to suffer enormous and unnecessary economic hardships. In describing this negative image, several commentors, including Mayor Ensslin, Supervisor Reed, Senator Vuich and Beckman, described how Porterville's efforts to attract new industry and development to its Enterprise Zone would suffer due to the expressed reluctance of industries to move to a community or area branded as contaminated. Also described was the potential for negative impact on the sales of produce and animal products from the area because of fear that these products may be "unsafe" due to exposure to the contaminated groundwater. Several commentors also said that land values and the marketability of land for development would be hurt due to the stigma of being contaminated and the long term uncertainty of when, if ever, the land would actually be completely cleaned up.

EPA Response: The purpose of remedial action is to ensure that contamination from the Beckman site is removed from groundwater and soil. Beckman has estimated that the upper aquifer will reach MCL standards within a year. The soil contamination can be removed in less than one year. Thus, these resources will be restored to full beneficial uses. The lower aquifer and aquitard will take considerably longer to remedy. However, as most have commented, Beckman has taken responsibility for the site.

2. Supervisor Reed said that he was concerned EPA's approach created a disproportionate focus on the remaining small problem which might convey an inappropriate image of the community. He urged EPA to balance its printed material in the same fashion as its oral presentations at the June 22, 1989 public meeting in Porterville.

EPA Response: EPA acknowledges the comment.

3. Beckman, as well as several residents, commented on the need to redefine the areal extent of site boundaries. These commentors agreed that it was unfair and unnecessary to have large areas of land within the original Beckman study area remain under a "cloud of contamination" for the 15 - 25 years necessary to achieve the clean-up goals. These commentors feel this is especially inappropriate given the dramatic size reduction of the contamination plume in the upper aquifer due to the operation of Beckman's pump and treat system. These commentors want EPA to clearly delineate which areas are contaminated and which are not and to remove these non-contaminated areas from the study area.

EPA Response: Until the site as a whole is determined to be free of contaminants, EPA will continue to monitor the remedial action. As portions of the site are cleaned up, EPA may chose to issue fact sheets describing this progress to date. These fact sheets are purely informative and are not a warranty nor are they to be considered as a release of any kind.

4. Several commentors said that it was unfair to "tie up" (essentially "freezing") people's land for 15 - 25 years to attain unnecessary and possibly unattainable clean-up goals. These commentors also objected to having to keep their land available for access by sampling and testing personnel for an indeterminate length of time.

EPA Response: EPA understands the inconvenience of continued access for testing purposes. However, the mission of EPA is to determine the extent of any contamination and whether a threat or potential threat to public health and the environment exists. To this end, EPA must continue to oversee the remedial action progress. Once an area is determined to meet cleanup goals, the applicable oversight schedule may be reduced. Future facts sheets will describe these changes.

5. Beckman suggested creating separate operable units to address the different contaminant problems. Beckman suggested that the upper aquifer be removed from the National Priorities List (NPL) once its clean-up goal had been achieved.

EPA Response: EPA has determined that the most efficient way to address this site is to implement concurrent remedial actions for each affected media.

Precedential Effects

1. Beckman, as well as Senator Vuich and a resident, commented on the potential precedential impact of EPA's proposed clean-up goals at the Beckman site. Beckman cited the question EPA will face regarding the applicability of these clean-up goals vs. MCLs to other sites around the country, including those sites on federally owned or operated facilities.

EPA Response: EPA acknowledges these comments. EPA has selected MCLs as clean-up goals.

2. Beckman also said that EPA's proposed clean-up goals would place a cloud over the adequacy of MCLs as drinking water standards by implying that MCLs and MCLGs are not really fully protective of public health.

EPA Response: EPA does not believe that the protectiveness of MCLs or MCLGs are questioned when cleanup goals are established at lower levels. Superfund sites often have a complex mixture of chemicals requiring cleanup levels more stringent than MCLs due to the additive nature of carcinogenic risk. EPA, however, has elected to establish MCLs as clean-up goals at this site.

3. Beckman also commented that rejection of MCLs as clean-up goals calls into question the adequacy of remedy selection at other sites where MCLs have already been selected, including state lead sites.

EPA Response: **Each Superfund site is unique and must be evaluated individually. See response to comment #2.**

PUBLIC PARTICIPATION PROCESS

Beckman, as well as several local residents, submitted comments regarding either the amount of time available to them during the public comment period to review EPA's Proposed Plan and related documents and prepare comments or the availability of public notice regarding site activities, in particular the scheduling of the public meeting and the public comment period.

Public Comment Period

1. Beckman states that they have been denied a reasonable opportunity to prepare and submit written and oral comments on EPA's Proposed Plan and related site materials as required by SARA/CERCLA. Beckman cites several examples including that the site's Administrative Record wasn't available to it until four (4) days after the start of the public comment period, and that EPA has failed to respond to Beckman's FOIA requests for additional materials.

EPA Response: **The Administrative Record for the site has been available at the Porterville Public Library since November 30, 1988. EPA updated the information on June 19, 1989. EPA will again update the Administrative Record to make it complete after the issuance of this Record of Decision. EPA has responded to the Freedom of Information Act request (FOIA) submitted by Latham and Watkins, attorneys for Beckman. Although a response was not issued until after the close of the public comment period, it must be noted that the public comment period is intended to be limited to comment on the remedial alternatives contained in and described in the Proposed Plan, the FS Addendum and Beckman's FS.**

2. Beckman expresses its appreciation to EPA for the one-week extension of the public comment period but states that it needed an additional thirty (30) days to conduct a thorough analysis of EPA's Proposed Plan and Administrative Record and prepare extensive comments.

EPA Response: **EPA believes that the public comment period provided ample opportunity to comment on the remedial alternatives described in the Proposed Plan and in Beckman's FS. EPA provided more time than is required under the current or proposed National Contingency Plan (NCP).**

3. Beckman also describes information missing from the Administrative Record which it believes should be included. This material includes all correspondence between EPA and Beckman and all correspondence between Beckman and others regarding the site where EPA received copies of the materials. Beckman also submitted additional documents with its written comments that were used in preparing its comments for inclusion in the Administrative Record.

EPA Response: Beckman should contact EPA with the information it believes is missing from the Administrative Record. EPA will review this information and place the appropriate material in the Record.

Public Notice

1. One (1) resident who lives in the vicinity of the site commented that he was concerned that his neighbors were unaware of the spread of the contamination plume in the lower aquifer toward them and the dangers it represents. This resident also fully supported EPA's Proposed Plan. One (1) commentor also said that some residents have the naive belief that Beckman, the local government and the EPA will not allow the Beckman contamination to harm their water supply.

EPA Response: Implementation of the remedial action specified in this ROD will ensure that the plume of contamination in the lower aquifer will not spread and that water supplies outside the zone of contamination are safe for all purposes.

2. Two (2) commentors said that they learned about the contamination problem from their neighbors and didn't receive EPA's "packet" (fact sheet) in the mail and believed that only a few people did.

EPA Response: EPA mailed over 1100 fact sheets to residents of the Porterville community; 92 were mailed from EPA's mailing list and over 1000 were mailed to residents in the site vicinity according to zip code. EPA also issued several press releases describing the material available at the public library. EPA apologizes to those residents who did not receive fact sheets and hopes that all interested individuals had a chance to provide their comments.

OTHER CONCERNS

Other concerns commented on include the need to be fair to Beckman in prescribing clean-up goals, EPA's credibility with Porterville's community members, health concerns and requests for water well testing.

Fairness

1. This issue was second only to the question of appropriate clean-up goals in drawing comments from Porterville community members. Mayor Ensslin, Supervisor Reed, Assemblyman Jones, Dr. Lessinger along with eleven (11) residents spoke to the need for EPA to be fair to Beckman in prescribing clean-up goals.

Most commentors including Mayor Ensslin and Assemblyman Jones said that Beckman had done an outstanding (exemplary, "world class") job in addressing its contamination problems, and that they should not be taken advantage of. They cited Beckman's early pro-active response to the discovery of groundwater contamination and the installation of its pump and treat systems which halted the spread and reduced the extent of contaminated groundwater. They observed that Beckman committed substantial resources to the problem many years earlier than it would have been required to do so under the Superfund program. These commentors cited the millions of dollars Beckman has spent in responsibly addressing the contamination problems, including providing bottled water and city water hookups to affected households and said that it was unfair to require Beckman to spend many more millions of dollars and years of work to accomplish unrealistic and unnecessary clean-up levels. These commentors generally urged EPA to, as one commentor at the public meeting expressed, "set reasonable standards and get off their backs"!

EPA Response: EPA sets clean-up goals to protect public health and the environment. EPA agrees that Beckman has been responsible in addressing the contamination caused by their operations.

2. Several commentors mentioned that in setting what appears to be grossly unfair and unnecessary clean-up goals for the Beckman site, EPA appears to be punishing a company who has acted as a responsible corporate citizen and has pro-actively and effectively addressed its contamination problems. In essence, "punishing them for doing a good job". Supervisor Reed observed that he was aware of the need for specific processes to be required in prescribing how government agencies carry out their responsibilities and deal with the public but observed that, absent some ability to be flexible and provide

alternative provisions for cooperative, good-citizen companies, these mandated processes can seem unfair and create confusion and concern among a community's citizens.

EPA Response: **See response to comment number 1.**

3. Several commentors stated that Beckman can be relied on to accomplish any reasonable clean-up activity and should be allowed to continue and complete their existing clean-up plan.

EPA Response: **EPA believes that Beckman will be cooperative in reaching a final clean-up agreement for this site. Part of the remedial action will be to continue their existing pump and treat system for the upper aquifer.**

4. One (1) resident wrote to say that if Beckman has to meet the .5 ppb clean-up goal then the city and all water companies should have to meet the same requirements.

EPA Response: **As discussed in an earlier response, all Superfund sites are unique and evaluated individually. Public water supply systems have to meet standards set under the Clean Water Act, most notably MCLs. As noted earlier, EPA is selecting MCLs as clean-up goals for this site.**

5. The Porterville Chamber of Commerce expressed concern that it appeared that Porterville was being singled out for a clean-up process that goes far beyond the norm.

EPA Response: **EPA establishes clean-up goals to protect public health and the environment. In this case, EPA has selected MCLS as clean-up goals after reviewing all the information and considering public comment.**

EPA's Credibility

1. One resident expressed concern that EPA's proposed clean-up levels at Beckman appear to be driven by outside influences, specifically congressional dissatisfaction with EPA or EPA's recent involvement in the Alar controversy. This commentor suggested that EPA was attempting to look good by zealously setting very conservative clean-up levels at detection limits.

EPA Response: **EPA's clean-up proposal is consistent with EPA regulations, policy and guidance.**

2. A resident suggested that EPA is so geared up to confront uncooperative companies that it is unprepared to deal with a company who started clean-up before EPA got involved and has made "doing the job right" a corporate priority. This same commentor also suggested that since it rarely, if ever, happens that EPA has declared a site clean, that EPA is simply not prepared to say when "it" is finished.

EPA Response: **EPA deals with all companies on an equal basis. The criteria for determining when the site has been cleaned up will be discussed between Beckman and EPA in upcoming negotiations.**

3. One individual commented that EPA "ambushed its own credibility" with the materials in the Endangerment Assessment as well as on other issues. He stated that he "can't believe a thing they say".

EPA Response: EPA acknowledges the comment.

Health Concerns

1. Three (3) residents commented about general health concerns they had for themselves and their families regarding past and potentially future consumption of contaminated groundwater. One (1) commentor stated that her husband had died of cancer and another commented on the "scum awful taste" of her well water currently.

EPA Response: EPA acknowledges the comments. The site contaminants are tasteless in the concentrations found at this site, however the commentor could have the well tested.

2. One (1) commentor said that although they have been hooked up to the city water system for her house, she uses well water to irrigate her garden and was concerned about the health risks posed by eating the garden vegetables.

EPA Response: In the EA conducted for this site, the maximum plausible risk associated with eating contaminated produce would be 8.8X10-6 or 8.8 chances in one million. This is well within EPA's risk range of 10-4 to 10-7. It is expected that the potential risk to this commentor to be much less than what was estimated in the EA, however EPA would be willing to discuss this further with the commentor.

3. Five (5) commentors requested that their wells be tested for the presence of contaminants. One of the commentors was the woman whose husband had died of cancer. One commentor stated that she had requested well testing before and had been told it would be done but it had never happened.

EPA Response: EPA has been requested to test residential wells south and southwest of the Beckman plant. Although the data currently gathered do not suggest that contamination has spread that far, EPA has contacted all these commentors and will be testing their wells in the near future.

Miscellaneous Concerns

1. One (1) commentor expressed anger that she hadn't received any monetary settlement from Beckman because she didn't know how to file for it. She observed that others on her street had received such settlements.

EPA Response: EPA suggests that this commentor contact private legal counsel for advice on how to proceed.

D. REMAINING CONCERNS

EPA is currently not aware of any issues or concerns that have not been addressed during the RI/FS and remedial planning activities.

ATTACHMENT

COMMUNITY RELATIONS ACTIVITIES

AT BECKMAN INSTRUMENTS

Community relations activities conducted at Beckman Instruments to date have included:

o Joint press conference to announce early sampling results held by Regional Board, DHS and Beckman (Summer 1983).

o EPA conducted community interviews with local leaders and community members (October 1986).

o EPA established an information repository at the Porterville City Library.

o EPA prepared and distributed a fact sheet on the availability of the RI/FS work plan for review (March 1987).

o EPA prepared and distributed a fact sheet update #1 to announce the Regional Board's proposed waste discharge requirements for Beckman's proposed groundwater extraction, treatment and discharge system (May 1987).

o EPA prepared a Community Relations Plan (August 1987)

o EPA prepared and distributed a fact sheet describing the availability of the draft Feasibility Study and EPA's Proposed Plan for public review and comment (June 1989).

o EPA conducted a briefing with Porterville's local leaders to explain EPA's Proposed Plan for the Beckman site (June 1989).

o EPA conducted a public meeting and public comment period to explain its Proposed Plan, answer questions and receive the community's comments (June/July 1989).